UNIVERSITY MICROFILMS
SERIAL PUBLICATIONS
300 N ZEEB RD
ANN ARBOR MI 48106

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Boston, Mass., and additional mailing offices ©1977 by Computerworld, Inc.

o. 46 November 14, 1977 75¢ a copy,$18/year

NEWSPAPER

Photo by Linda Thomas

Different Strokes . . .

Three crews competing in the annual Head-of-the-Charles Regatta in Cambridge, Mass., race under a bridge on the Charles River. Two CPUs in Waltham, Mass., linked to terminals on the river banks helped time 720 entries. Story on Page 5.

IBM a DP Monopoly, Moved Against Rivals, Internal Memos Admit

By Catherine Arnst
CW Staff

NEW YORK – An IBM attorney admitted as early as 1963 that the firm maintained an "almost unchallenged monopoly position" in the computer industry, according to an internal company memo placed into evidence in the U.S. vs. IBM antitrust trial here.

Other newly introduced documents indicate IBM chose to unbundle its software and services prices from the hardware prices of its systems not only because of antitrust considerations, but also to control the growth of rival leasing companies.

The documents are part of a group that IBM has been trying to keep out of the public record in the case for the past nine years through claims of attorney-client privilege [CW, Nov. 7].

The 1963 memo – from Ken Seggerman Jr., an attorney for the General Products Division, to that division's president, John W. Hannstra – stated that "we tend to adjust our product line and our prices not in response to competition in general, but to thwart competition on an individual basis."

This was because "our secondary objective, to which we have mistakenly given too high a priority, has been to maintain a relatively stable rate of growth," Seggerman said.

To meet that goal, IBM increased its rental and profit margins "in the face of gradually increasing competition (for example, the increase of 'normal' profit from 30% to 35%) and we have increased purchase prices even more in relation to rentals in an attempt to 'manage' the flow of profits despite much lower purchase rental ratios of our competitors," Seggerman told Hannstra.

The attorney asserted that it made "better business sense and better antitrust sense" to respond to long-term trends in the marketplace rather than current and near-term growth.

"I am confident that [IBM] could also survive retrenchment to meet the demise of our hitherto almost unchallenged monopoly position," Segger-

(Continued on Page 6)

Bill Would Create Privacy Board

By Nancy French
CW Staff

WASHINGTON, D.C. – A bill has been introduced in the House of Representatives that would create a Federal Information Practices Board to review and report on fair information and privacy practices of government agencies and to a certain extent business organizations.

In keeping with the recommendations of the Privacy Protection Study Commission issued last July, the board would have no enforcement powers. However, it would oversee implementation of the Privacy Act of 1974 – a function now left largely undone.

The board would also assume some of the functions concerning the private sector previously performed by the now defunct Privacy Protection Study Commission that conceived it.

Introduced by Representatives Barry Goldwater Jr. (R-Calif.) and Edward I. Koch (D-N.Y.) only a week before Koch was elected mayor of New York City, H.R. 9986 assigns the board responsibilities for reviewing the effect of governmental and business information practices on individuals and their privacy.

It also assigns to the board the function of "investigating" the privacy implications of transnational data flows, electronic funds transfer, criminal history information and census activities.

The board would be composed of five full-time members appointed by the President and approved by the Senate. They would include persons repre-

(Continued on Page 2)

Senate Launches Trial EFT Bill

By Edith Holmes
CW Staff

WASHINGTON, D.C. – A U.S. senator has introduced legislation that would permit banks and other financial institutions to establish Electronic Funds Transfer (EFT) facilities despite branch banking laws that currently limit the proliferation of EFT terminals.

Characterizing his bill as a trial balloon, Sen. Thomas J. McIntyre (D-N.H.) said that while the legislation would implement the recent recommendations of the National Commission on Electronic Fund Transfers [CW, Nov. 7], its chief intent "is to

(Continued on Page 6)

Single Modem Combines Data Sets From Vadic, Bell

By Ronald A. Frank
CW Staff

SUNNYVALE, Calif. – A microprocessor-controlled modem that is reportedly compatible with three commonly used low-speed data sets has been introduced by Vadic Corp.

The VA3467 can automatically recognize data received from a Bell System 103 and 212 and a Vadic 3400 data set, according to the vendor.

Vadic originated 1,200 bit/sec full-duplex transmission of data over a two-wire facility with the VA3400; this concept was followed several years later by AT&T with its 212 unit. The data sets use different modulation frequencies, however, and are not compatible.

The VA3467 is the first modem to combine both the Vadic and Bell capabilities into one unit along with the Bell 103 (300 bit/sec) speed, a spokesman claimed.

The automatic recognition sequence that identifies an incoming signal to the VA3467 operates under microprocessor control and does not disturb normal connect protocols for any specific modem, Vadic said. Terminal interface operation is transparent to the modem type used.

Computers that are compatible with any of the three modem types used in the VA3467 will operate with the unit "without altering hardware and software," the company said.

Users who want to order the VA3467 without its full capabilities can later upgrade the unit in the field depending on modem combinations installed, the spokesman noted.

(Continued on Page 5)

'Marginal People'

By Don Leavitt
CW Staff

NEW YORK – "Lots of programmers ... struck me as marginal people" and "managers use structured programming to de-skill and control their programmers" are keystone thoughts of a recent book describing the "routinization" of programming in the U.S.

In *Programmers and Managers*, sociologist Philip Kraft said he got to know many programmers as neighbors, students and colleagues in Binghamton, N.Y. He tagged them "marginal" just before noting "they didn't fit neatly into the stereotypes commonly applied, however unjustly, to engineering workers as a whole.

"They did not look like engineers are supposed to look (crew-cuts, narrow ties, penny loafers, etc.), nor were they taciturn and awkward around nonprogrammers. They did not appear to be particularly conservative, either politically or socially."

And, finally, "many were women."

On the other hand, Kraft added, if programmers could "pass" as nonengineers in a nonengineering world, "they were not exactly academics or managers or salespeople either."

After outlining the myriad titles

(Continued on Page 4)

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
TM reg U S Pat. Off.

EDITORIAL

Editor	E. Drake Lundell Jr.
Deputy Editor	Ronald A. Frank
Managing Editor	Nancy French
Associate Editor	Donald Leavitt
Associate Editor	Esther Surden
Associate Editor	Molly Upton
Assistant Editor	Frank Vaughan
Washington Bureau	Edith Holmes
Staff Writers	Catherine Arnst Jeffry Beeler Timothy J. Scannell Brad Schultz
Chief Copy Editor	Cheryl M. Gelb
Copy Editors	Barbara T. VanScoyoc Susan Gerrard
Photography Editor	Ann Dooley
Editorial Assistant	Denise Pelski
Editorial Cartoonist	Jim Orton
Bureaus:	
London	Roger Frampton
Munich	Hans-Jurgen Ballnath
Asia	Hidetsuna Sasaki
Contributors:	
Education	J. Daniel Couger
Legal	Roy N. Freed
Taylor Reports	Alan Taylor
Human Connection	Jack Stone

SALES

Vice President/ Marketing	Roy Einreinhofer
Advertising Administrator	Terry Williams
Display Advertising	Mary Anne Furlong
Classified Advertising	Frank Collins
Recruitment Advertising	Kathy Steinberg
Sales Promotion Director	Jack Edmonston
Market Research	Kathryn V. Dinneen

CIRCULATION

Vice-President/ Circulation	Margaret Phelan
Circulation Manager	Barbara Jeannetti
Customer Service Rep	Peggy Kelly
Assistant	Maureen Burke

PRODUCTION

Manager	Lee Vidmer
Supervisor	Henry Fling
Assistant Manager	Peter Holm
Typesetting Supervisor	Donna Turnbull

Please address all correspondence to the appropriate department at 797 Washington Street, Newton, Mass. 02160. Phone: (617) 965-5800 Telex: USA-92-2529

OTHER EDITORIAL OFFICES: **England:** Computerworld Publishing Ltd., 2 Bath Road, London W41LN. Phone: (01) 995-3352. Telex: 934287. **W. Germany:** Computerworld, c/o Computerwoche GmbH, 8000 Munchen 40, Tristanstrasse 11. Phone: 36-40-36/37. Telex: 5215350. **Asia:** Computerworld, c/o Dempa/ Computerworld Company, Dempa Building, 1-11-15, Higashi Gotanda 1-chome, Shinagawa-ku, Tokyo 141. Phone: (03) 445-6101. Telex J2424461.

Second-class postage paid at Boston, Mass., and additional mailing offices PN127420. Published weekly (except. a single combined issue for the last week in December and the first week in January) by Computerworld, Inc. Copyright 1977 by Computerworld, Inc. All rights reserved. Reproduction of material appearing in *Computerworld* is strictly forbidden without written permission. Send all requests to Walter Boyd.

75 cents a copy. U.S.— $18 a year, Canada and PUAS — $28 a year; Europe and Middle East — $50 a year, all other foreign — $65 a year. Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone. (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

COMPUTERWORLD, INC.

Board Chairman/ Publisher	Patrick J. McGovern
President	W. Walter Boyd
VP-Marketing	Roy Einreinhofer
VP-Finance	William P. Murphy
VP-Circulation	Margaret Phelan

ABP MEDIA DATA FORM

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld Circulation Dept., 797 Washington St., Newton, MA. 02160. ac

Judge Agrees to Replace Examiner

By Catherine Arnst
CW Staff

NEW YORK — Judge David N. Edelstein granted "with reluctance" a government motion that the person it requested to examine IBM files in the U.S. vs. IBM antitrust trial now be removed.

Herbert H. Isaacs, a director of Arthur Young & Co., was appointed by Edelstein in August to search IBM corporate files for statistical information on the firm's installed systems [CW, Sept. 12].

The government originally suggested Isaacs' name, but then requested its removal [CW, Oct. 31] after IBM filed a writ of mandamus with the Second Circuit Court of Appeals complaining of a conflict of interest — the accountant was also working for Memorex Corp. as a paralegal in its antitrust suit against IBM [CW, Oct. 10].

In his order last week, Edelstein said "the court remains convinced that its appointment of Mr. Isaacs as examiner was within its sound discretion.There was not then, nor is there now, a conflict of interest or appearance of conflict resulting from Mr. Isaacs' nonadversarial support role with Memorex.

"Despite these convictions, however, the court has determined with reluctance that the elements of delay are such that the government's motion should be granted. Resolution. of defendant's proceeding in the court of appeals is not likely to occur until sometime in 1978." The judge added that he hoped the expedition of the 2-1/2-year-old trial would be served by granting the government's motion.

However, IBM will probably take issue with this order, too, as it contains some of the same procedures to which the firm objected when Isaacs was appointed. IBM's writ complained that the government did not consult with it prior to submitting a list of persons to the court for appointment and that the firm had only one day to object to any of those persons.

Edelstein's current order also allowed IBM only 24 hours to respond to a list of government-selected names. In addition, IBM wants only a lawyer, not an accountant, to be appointed as examiner, while Edelstein "is convinced that [the] choice of a nonlawyer to act as examiner is entirely appropriate and may, in fact, serve to facilitate completion of the duties of the examiner," his order said.

Bill Creates Privacy Board

(Continued from Page 1)

senting law enforcement, business, computer and communications technology, civil rights and liberties and information security, Koch said recently on the House floor. Each member would serve for only one four-year term.

A part of the executive branch, the board would monitor and investigate compliance with federal fair information practices laws, including the Privacy Act of 1974, the Fair Credit Reporting Act, the Fair Credit Billing Act, the Family Educational Rights and Privacy Act of 1974, the Freedom of Information Act and the Government in the Sunshine Act.

No federal agency could publish any proposed rules implementing a fair information practices law without first consulting with the board, according to the bill.

In addition to its watchdog function, the board would also directly assist individuals with privacy complaints.

With a staff of as many as 50 civil servants, it would assist those individuals by providing them with clear statements of their rights and remedies under the applicable federal law and identifying the persons responsible for administering the appropriate law.

The board would also prepare and submit to the President and Congress an annual report that included a statement of its activities during the previous year and recommendations for action by the executive, legislative and judicial branches of the government and by the states and private sector.

The annual report would also include a review of any new information technologies and practices developed or marketed during that year.

The board would also prepare and submit to relevant agencies or business organizations, the President and Congress the results of any investigation deemed by the board to be "of significance."

H.R. 9986 gives the board subpoena power as well as the power to hold hearings and take testimony under oath.

Any agency that receives a report on an information practice which the board finds to be in violation of a federal fair information practices laws would have to prepare and submit to the board, the President and Congress a written statement describing the measures taken to alleviate or remove any problems or deficiencies identified in the report, the bill said. This provision does not apply to business.

On the Inside This Week

NEWS

Probe Finds Sci-Tek Violated Code of Conduct 4
Backup Systems Prove Worth in Charles Regatta 5
Hammer: DP Creating Also Easing Complexity 8
Mass. Welfare Wants to Tap Private Bank Files. 9
Farmer's Almanac Predicts Hard Winter Ahead 10
System Changing Earlham Education Process 12
DP's Status Seen Block to Data Base Success 13
Training Program for Inmates 10 Years Old. 14
Order Basic Unit in Information System. 17
Scouts Learn More Than Wilderness Skills 18
System Conversion Woes Can Be Eased: GAO. 19

EDITORIAL

Editorial: Time to Face Reality. 20
Human Connection: Degree Requirements Debated. . 21
Taylor Report: Classify Errors for Understanding 21
Pompous Verbiage Clouds a Good Thesis. 22
. . .But 'Speech Surgery' Stunts Imagination 23
eaching DP Nitty-Gritty Not Colleges' Job 24
P's Position in Corporate Structure Shifted 25

SOFTWARE & SERVICES

Package Designed to Tame Costs of Manufacturing. . 27
UCLA Adds to 'BMDP' 28
General Ledger System Gains On-Line Option 29
Dictionary 'Cornerstone' of Data Management 30
Trucker Rides DBMS Road to Increase Profit 31

COMMUNICATIONS

Performance Seen Key to Terminal Use 39
Computek Adds Text Processing System 40
Tektronix CRT Turns Alphanumerics to Graphica 51
Diversity of Electronic Mail Systems Examined 52
Citibank Reported Running Private Packet Net 53

SYSTEMS & PERIPHERALS

Micr Sorter Does 2,600 Check/Min in One Pass 57
NCS Brings Out Optical Mark Reader/Recorder 80
NMA Publishes COM Resources 81
Eotec Unwraps Line Monitor 82
Compuscan OCR System Uses Smart CRT 63
Course Aimed at Preparing for Office of Future 64

MINIWORLD

BST Offers 3741 Stand-In 65
Philips Gives U.S. Users System Options. 66
Educational Units Packaged 68
CDC Extends Disk Options 70
Small System Treats Pharmacy's Cash Flow Ills 71
Redundant Minis Viewed Path to Fault-Tolerant DP . . 72

MICROCOMPUTING

First Midwest Show Has Local Flavor 73
Learner's Lexicon. 74
RCA Microtutor II Gives Programming Experience . . . 75

COMPUTER INDUSTRY

IBM's Good Equal to Nation's: Memo. 77
CCIA Joins Opposition to I/O Proposal 77
NCR Employees Vote to End Strike in Dayton 79
GA Moving From OEM to Packaged Systems 80
Weme Forms New England Group 81
Amdahl Tops $6 Million. 82
CDC Units Read, Sort Micr Documents 83

MICROCOSM

Intel 8-Bit Micro Costs $3 84
National Cards Aid Control System Design 85
Rockwell Extends PPS Line. 86

If you haven't switched from IBM's SPM II to ADR's LIB/OL simply because of price...

SWITCH NOW!

The new monthly price of ADR's LIB/OL is very competitive. So now there's more reason than ever to switch to the system that dramatically outperforms IBM's SPM II. You can switch easily, without penalty.

The LIBRARIAN®/Online supports 3270s far better than SPM. Function key control instead of transaction codes. Full screen editing instead of one-line-at-a-time. Dual screen operation for simultaneous scrolling and data entry instead of flip-flops between different transactions.

LIB/OL is easier to use. If you know the 3270 keyboard, you already know LIB/OL. And you get all the results SPM users get with far less typing. That means fewer errors and shorter terminal sessions.

LIB/OL's libraries hold more data in less disk space; no reorganizing required. LIB/OL changes 20 screen lines with one CICS transaction. SPM takes 40 transactions. ADR's system can be installed without generating Basic Mapping Support. IBM's can't. Even more important, LIB/OL uses 60% fewer CPU cycles and EXCPs to do the same job as SPM.

ADR installs LIB/OL. Supports it. Guarantees it. Converts your SPM files.

SPM II comes as is. No guarantee. No obligation to fix bugs. Or upgrade for new systems or devices.

At the present competitive monthly rate of LIB/OL, you can't afford not to switch.

Contact ADR today for its competitive analysis of SPM II and LIB/OL and for additional information on why over 400 companies have selected LIB/OL.

Name/Title Company Address

City/State/Zip Telephone Computer Configuration

APPLIED DATA RESEARCH THE ON-LINE SOFTWARE BUILDERS™
Route 206 Center, Princeton, N.J. 08540, Phone: 609–924-9100

Each ADR product is not just a program but a complete package with full documentation and on-site support. ADR is the only software company with 50 branch offices and representatives in over 30 countries—each staffed with ADR-trained technicians.

ADR software products: In use at over 6000 installations worldwide. U.S. offices in Boston (817) 245-9540, Chicago (312) 694-2244, Cleveland (216) 826-0190, Houston (713) 526-3188, Los Angeles (213) 826-5527, New York (212) 986-4050, Princeton (809) 924-9100, San Francisco (415) 391-0690, Washington, D.C. (703) 281-2011. **Foreign offices** in Australia, Austria, Belgium, Brazil, Canada, Denmark, England, Finland, France, Germany, Holland, Hong Kong, Israel, Italy, Japan, Korea, Malaysia, Mexico; New Zealand, Norway, Philippines, Portugal, Puerto Rico, Republic of South Africa, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Venezuela.

Member SIA Software Industry Association

Probe Finds Sci-Tek Violated Code of Conduct

By Ann Dooley
CW Staff

BOSTON — A state investigative committee has found Sci-Tek Associates, Inc. guilty of two violations of the state code of conduct and has barred the company from any further participation in a controversial $23 million facilities management contract for the Administration and Finance Department (A&F).

While investigators concluded there was insufficient evidence to press criminal charges against the New Hampshire firm, Sci-Tek will be subject to administrative sanctions, state officials said.

And, as another result of the investigation by the Attorney General's Office, DP consultants will no longer be able to vote on any DP procurement selection board in Massachusetts, they added.

The conflict of interest charges were made when it was discovered that two Sci-Tek officials were members of the contract selection committee that awarded the facilities management contract to Electronic Data Systems, Inc. (EDS) [CW, Sept. 19]. Sci-Tek and EDS were jointly involved in a $1.6 million contract in Tennessee during the time of the Massachusetts vendor selection process.

No action has been taken against EDS; that company is free to rebid for the contract if it wishes.

In an investigation requested by Gov. Michael S. Dukakis, the State Attorney General's Office interviewed other members of the contract selection board, Sci-Tek and EDS employees and Tennessee officials; it also reviewed records of communications between EDS and Sci-Tek.

The investigators found Sci-Tek had violated state codes whch prohibit conduct that might give the impression or raise a suspicion of improper activity.

In reviewing the selection process, it was found that EDS ranked fifth out of a field of five vendors which met the technical requirements. The first three bidders were invited to participate in the second phase of bidding; the other two were advised to exercise their own busines judgment.

However, all five bidders were very close in their bid responses, the investigators reported, and EDS believed there was no real impediment to its being awarded the contract. EDS' confidence was high, the firm's legal counsel said, because two of the five bidders were subsequently disqualified, the technical review was only 30% of the total evaluation, certain misunderstandings about parts of the EDS proposal had occurred and EDS' cost proposal was much lower than those of the three top contenders.

Although Sci-Tek became interested in the Tennessee contract in late December, about the same time as the technical review, both companies claimed there was no contact between them concerning the Tennessee contract until early February.

Several phone calls were made between the two companies (one on the same day Sci-Tek became interested in the Tennessee contract), but both firms said they were concerned only with the Massachusetts contract.

In the contract award procedure's cost performance proposal phase, which took place in January, all selection board members ranked EDS first among the bidders. One week after that evaluation, EDS, Sci-Tek and Tennessee officials met to discuss the contract.

EDS asserted it had no knowledge that a vote was about to or had just taken place by the Massachusetts board when it was first contacted by Sci-Tek. Company officials also stated that the Tennessee contract was an "arms-length transaction" only. After examining the contract, the investigators concurred with that statement.

EDS officials also said they sought and received assurances from Sci-Tek that there would be no conflict of interest between the two contracts. Sci-Tek requested and received such an assurance from the selection board, although neither the A&F Secretary nor the Attorney General were consulted, investigators learned.

Investigators did find that Sci-Tek's conduct in "discussing the [Tennessee] proposal with individuals associated with the firms they were evaluating for the Massachusetts contract before the results of the evaluation were final and public" violated Massachusetts law.

'Wasting Their Time'

BOSTON — Sci-Tek Associates, Inc. has bid on a Massachusetts merit rating board contract despite a pronouncement from the governor that the company should not be involved in any state business.

Gov. Michael S. Dukakis made the statement after an Attorney General's investigation cited Sci-Tek for improper behavior concerning a conflict of interest in a recent state contract award.

"I'm surprised to learn [Sci-Tek] submitted a bid," Dukakis said.

Sci-Tek, which had been working under a no-bid contract for the Merit Rating Board, was scheduled to complete that contract Oct. 1. Bidding for the new contract is currently in progress and a contract decision is scheduled to be made Dec. 12.

Although Sci-Tek cannot be prohibited from bidding on any state contract, it would be "unfortunate if [the company] continued with that contract," Dukakis stated.

The governor has no direct influence on the contract selection board since it acts independently, but Dukakis hopes the board will take into consideration the Attorney General's findings, according to Alan Raymond, press secretary.

"They [Sci-Tek] aren't going to get it, they're wasting their time," Dukakis is reported to have said when he heard of Sci-Tek's bid.

Programmers 'Marginal'

(Continued from Page 1)

and job functions he found related to programming, Kraft determined that "some software workers are primarily engineers, while others are high-powered clericals."

It is the engineering efforts of some of these software workers — rearranging and redesigning work tasks and simplifying them so they can be done by less skilled workers or by machines — that has provided management with the means of "de-skilling" the average programmer's occupation, he said.

Structured programming has become just such a tool in the hands of today's management, Kraft said, even though theoreticians such as Edsgar Dijkstra and David Gries "have stressed in their writing that they see in structured programming the possibility of enlarging, rather than diminishing, the skills, knowledge and understanding of the average programmer."

But managers have always been selective in what they use to further their own ends, "ends which are invariably informed [sic] by the desire to reduce costs and increase profits," the sociologist noted.

"Barely a generation after its inception, programming is no longer the complex work of creative and perhaps even eccentric people. Instead, divided and routinized, it has become mass-production work parcelled out to interchangeable detail workers," he said.

Restrictions Imposed

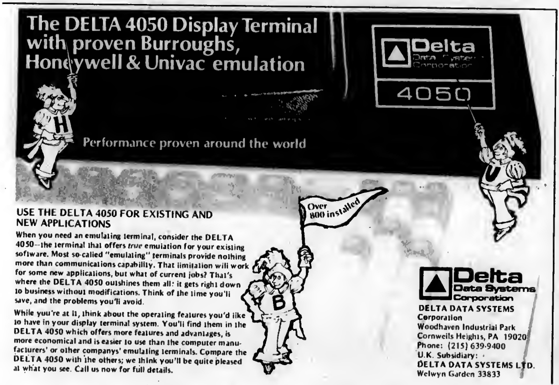
Structured programming methods impose restrictions on the number and type of logical procedures a programmer may use.

There is, he continued, a similar restriction, imposed by the "logic" of the structured programming technique being used, on the kind and quantity of information that may be called upon for calculation.

To aid in the production of a standardized product, structured programming as a way to structure work has been complemented by various social arrangements to structure the relationships between software workers, Kraft said, noting the most important of these "arrangements" are modular programming and chief programmer teams.

The chief programmer team divides the "conceptual architectect" and his assistants from the people who actually write the code; modular programming "carries the process a step further" and establishes divisions between the detail workers themselves, he asserted.

Kraft's 118-page soft-cover book is part of the Heidelberg Science Library, costs $6.90 and can be ordered from publisher Springer-Verlag, 175 Fifth Ave., New York, N.Y. 10010.


The DELTA 4050 Display Terminal with proven Burroughs, Honeywell & Univac emulation
Delta Data Systems Corporation
4050
H
U
B
Performance proven around the world
Over 800 installed

USE THE DELTA 4050 FOR EXISTING AND NEW APPLICATIONS

When you need an emulating terminal, consider the DELTA 4050—the terminal that offers *true* emulation for your existing software. Most so-called "emulating" terminals provide nothing more than communications capability. That limitation will work for some new applications, but what of current jobs? That's where the DELTA 4050 outshines them all: it gets right down to business without modifications. Think of the time you'll save, and the problems you'll avoid.

While you're at it, think about the operating features you'd like to have in your display terminal system. You'll find them in the DELTA 4050 which offers more features and advantages, is more economical and is easier to use than the computer manufacturers' or other companys' emulating terminals. Compare the DELTA 4050 with the others; we think you'll be quite pleased at what you see. Call us now for full details.

DELTA DATA SYSTEMS
Corporation
Woodhaven Industrial Park
Cornwells Heights, PA 19020
Phone: (215) 639-9400
U.K. Subsidiary:
DELTA DATA SYSTEMS LTD.
Welwyn Garden 33833

720 Crews Clocked

Backup Systems Prove Worth During Regatta

By Molly Upton
CW Staff

CAMBRIDGE, Mass. — How much timing backup is necessary for a regatta in which 720 entries are rowing against the clock?

The 13th Annual Head-of-the-Charles Regatta had terminals logged onto two Digital Equipment Corp. Decsystem-10s, with another one standing by, and about six people armed with digital readout stopwatches.

By the end of the regatta, which lasted six and a half hours and provided competition for more than 3,000 oarsman and oarswomen. ranging in age from 17 to 77, two of the CPUs had been pressed into action and the stopwatches had proven their value.

To time the contestants, an operator at the starting line used an on-line terminal to key in the appropriate bow number and starting time of each boat.

A similar entry was made at the finish three miles upstream on the Charles River, where terminals were housed in a trailer hauled in for the regatta. Stopwatch times were also recorded at the start and finish.

At ADP First Data Corp., in Waltham, Mass., a Decsystem-10 subtracted the start time from the finish time and ranked the boats in their order of finish, indicating their times to a tenth of a second. The system also calculated handicaps, based on age, for the "veterans" race.

The crews started about 10 seconds apart, so there was little way for contestants or spectators to know who among the 40 entrants in each of the 18 races had emerged victorious.

This year, the backup systems proved not only prudent but necessary. During the 16th event, the starting terminal disconnected, according to regatta director Lawrence Copley.

A series of human errors ensued, such as the reopening of the file on event 15, which delayed the reporting of results in events 15 through 17. Normally the regatta is able to issue unofficial results about 10 minutes after an event is over.

While dealing with the problem of where to find the data from event 16, the starting terminal operator switched over to the second system at ADP First Data for events 17 and 18, Copley said.

But at the finish, times for event 17 were being logged on the first system.

Because of the problems, some times were lost in the system, but they were recorded on the terminals' logs, Copley said.

After comparing stopwatch times with the times recorded on the terminal printouts and those stored in the system, the timing committee then entered the appropriate times into one system, which calculated the results.

Postrace Adjustments

Despite the hassle, the regatta managed to award first-place prizes while crews were attending the postregatta reception. Prior to determining official results, judges' observations of course violations and decisions on protests had to be keyed into the system, which then issued new rankings.

After examining the course of events, the regatta directors concluded the software does not display enough status information and/or recovery instructions for use by people unfamiliar with the software structure.

But the software, written by Cambridge Boat Club treasurer Chuck Roth, does anticipate a lot of problems and helps avoid them, Copley said.

Modem Handles Three Data Sets

(Continued from Page 1)

The VA3467 is being registered with the Federal Communications Commission for connection to dial-up lines using the plug-and-jack arrangement approved under Part 68 of the commission's regulations. The unit also accommodates Bell Data Access Arrangement (DAA) configurations, Vadic said.

According to the company, the VA3467 "satisfies every answer mode application for switched network data transmission in asynchronous data format at rates from 0- to 1,200 bit/-sec." Users can install modems without modifying software or establishing new connect procedures for remote terminals, the spokesman said.

The modem utilizes an Intel 8035 microprocessor and includes continuous self-test, analog loopback/busy out, digital loopback and transmit reversal capabilities.

The modem comes in four versions. The VA3467 supports VA3400, 212 and 103 operation; the VA3427 combines VA3400 with 212; the VA3437 supports VA3400 and 103; and the VA3447 communicates only with the VA3400.

The VA3400 capability costs $650, the 103 adds $50 and the 212 is priced at $150. A three-modem capability costs $850.

First deliveries are scheduled for January. Vadic is at 222 Caspian Drive, Sunnyvale, Calif. 94086.

COMPUTER ASSOCIATES PROUDLY ANNOUNCES...

DYNAM/T

The most advanced and complete Tape Library Control System ever announced for IBM 360/370 DOS and DOS/VS users!

Now - - DP Managers have available an advanced Tape Library Control software system that automatically manages the magnetic tape library of DOS and DOS/VS users, with complete file security and greatly simplified operational procedures.

Compatible with most tape systems, DYNAM/T offers you a combination of features that are not available in any other system - - features that dramatically improve resource utilization.
For example - -

- DYNAM/T is DOS and DOS/VS release independent, requires no modifications to the supervisor, JCL language or user programs.
- Automatic Volume Recognition and Early Device Release features eliminate the need for reservation of tape drives for each partition.
- DYNAM/T logs exceptional occurrences for audit trail and accepts alphanumeric volume serial numbers.
- DYNAM/T provides comprehensive reporting of all tape activity.
- DYNAM/T allows for control of an unlimited number of tape volumes and unlimited number of tape file generations.
- Automatic rerun facility.
- Fully automatic multi-file, multi-volume handling.
- Allows manual and automatic catalog of tape files.
- Provides control of unlabeled tapes.
- Automatic release of tape sort work files.
- Allows use of alternate data sets for input.
- Total tape file security.
- Does not allow duplicate tape reel numbers.
- DYNAM/T's Early Device Release feature permits the immediate use of the tape drive by another partition.

Those are just a few of the features that make DYNAM/T a major advance in software systems.

CA-SORT is without question the Number One sort software system with more than 2,000 users worldwide. DYNAM/D is the widely acclaimed most advanced and complete Disk Space and Catalog Management software system ever released. Now Computer Associates adds still another dimension to software systems: DYNAM/T, destined to become another star performer for professional DP Managers.

**EASILY INSTALLED - - TEST DYNAM/T
FREE FOR 15 DAYS!**

Just mail the coupon or telephone collect to obtain the complete DYNAM/T Information Kit and details of the FREE 15-day trial.

COMPUTER ASSOCIATES

U.S. OFFICES California, Connecticut, District of Columbia, Georgia, Illinois, New York, Ohio, Texas
WORLDWIDE OFFICES Argentina, Australia, Austria, Belgium, Brazil, Denmark, France, Germany, Holland, Italy, Japan, Switzerland, United Kingdom

FILL-IN AND MAIL TODAY
Computer Associates
655 Madison Avenue, New York, N.Y. 10021
CW 11/14/77

YES! Rush the complete Information Kit and details of the DYNAM/T 15-day FREE trial.

☐ Also send Information Kit for CA-SORT
☐ Send Information Kit for DYNAM/D

Name ....
(Please Print)
Company ....
Address ....
City.................. State.................. Zip..................
IBM Computer Model .... Operating System..............
My telephone number: ....
(Please include area code)

**FOR FASTER ACTION: TELEPHONE RIGHT NOW . . .
(212) 355-3333**

1977 Trans American Computer Associates, Inc.

Memo: IBM 'Almost Unchallenged Monopoly'

(Continued from Page 1)

man stated.

In the area of competition with leasing companies, the government has charged that in the late 1960s IBM considered unbundling services and instituting a "subsequent user policy" as a method of stopping the encroachment of leasing companies in the industry. One of the newly introduced memos seems to bear out this contention.

Although "any IBM executive who suggests that our DP service contract price should be even partially unbundled is likely to be regarded by his associates as a man in need of a vacation," such a policy was urged by Hilary Faw, assistant treasurer for IBM, in an August 1968 memo.

By then the Department of Justice had begun investigating IBM on antitrust grounds, and "legal opinion from both outside and inside counsel could suggest that the IBM pricing practice of a single charge for the combination of services could be regarded as a tie-in sale under the Clayton Act," Faw warned.

"A self-imposed unbundling internally designed and implemented by IBM" would be more desirable than any remedies resulting from a lawsuit, partially because it could be designed to slow down the inroads leasing companies had already made on IBM's installed base, Faw said.

Unless IBM realized "that leasing companies have already made it impossible to do business as usual in the future," Faw said, "we will be predisposed to a step-by-step retreat in the face of increasing demands by leasing companies to committing more and more free support services to subsequent users.

"If this step-by-step erosion is permitted to occur, we may find it legally impossible at some later time to impose a price for these services."

An unbundling announcement had to be timed right, he cautioned. Financial difficulties for leasing companies were expected to become "commonplace in the next two years. The threat of an antitrust violation stemming from the bundling superimposed on the possibility of numerous leasing company failures poses a treble damage exposure of unbelievable magnitude," Faw said.

IBM began unbundling user services in 1969.

The firm also began in the 1968-69 timeframe to change its policies toward leasing firms as opposed to other IBM users by refusing to provide services for other than the first user of a system. This policy was invoked to hurt the leasing companies, the government charged after studying another internal IBM memo.

That document is a draft for presentation to a Management Review Committee meeting on Nov. 27, 1968. It suggested dropping the practice of treating first users and subsequent users the same and recommended using "as rationale that administration of old policy [is] becoming increasingly difficult to apply in an equitable manner, or something to that effect."

The suggestion was evidently made in response to the threat of a lawsuit by DPF&G, a leasing firm, over the way the old policy had been administered.

"Say nothing to [Harvey] Goodman [of DPF&G] — but get this out before he has a chance to file his complaint," the memo said. "Take away Goodman's principle source of complaint" and "halt accumulation of damages to leasing companies.

This would cause "our move to come before [the] Goodman suit when and if he files. [The] public will not *know* our move was related to the suit, and we can avoid comment that we are merely reacting to outside pressure," it said.

"In retrospect (assuming we unbundle) [the] public will realize this was a strategic first move of [a] thoughtfully conceived plan.

"If Goodman does file, he is likely to be regarded as some kind of nut (he will be in the position of trying to enforce antitrust laws, violation of which are helpful to him and to other leasing companies)."

The authors of all these documents were highly placed corporate officials who were also members of IBM's executive staff, supporting an earlier claim by the government that "IBM's highest corporate officials recognized IBM's monopoly power ... and undertook ... to minimize the likelihood of detection and liability."

Senate Gets Trial EFT Bill

(Continued from Page 1)

provide the necessary catalyst to an understanding of how best to serve the banking needs of the American public in the 1980s and beyond."

McIntyre, who chairs the Senate Banking Subcommittee on Financial Institutions, stressed the need "to modernize our banking laws with regard to the geographic placement of banking services.

"At the very least," he told the Senate, "financial institutions must be permitted to service their customers through electronic means ... where they live, work and shop."

In addition to overriding the traditional bank branching laws embodied in the 1927 McFadden Act, McIntyre's bill addresses such issues as consumer privacy, EFT facilities that are shared by financial institutions and the role of government in EFT.

The Subcommittee on Financial Institutions will hold hearings on the proposed legislation early next year.

No Artificial Barriers

The Bill S. 2293, expresses the EFT commission's finding that consumers will benefit from the extension of EFT systems through competition among financial institutions and other business enterprises. Neither geography nor government regulation should be allowed to create artificial barriers to EFT growth, the bill said.

McIntyre proposed that all federal financial institutions — national banks, federal savings and loan associations and federal credit unions — be permitted to establish or use EFT systems in the U.S. and abroad.

In general, the bill would not permit these federal organizations to offer deposit services through EFT systems outside their home states. It does, however, provide for two exceptions to this rule: out-of-state deposit services may be made available when state laws permit it or when an institution's "natural market area" extends beyond the state's boundaries.

The bill specifically authorizes a financial institution that owns or operates an EFT system to make it available for use by other financial institutions, retailers or other businesses through franchise, lease or corresponding arrangements.

The proposed legislation reaffirms tht the antitrust laws will apply to EFT services to ensure the development of competitive systems. State mandatory sharing statutes are particularly pre-empted by the federal bill on the ground that they "will tend to thwart the formation of rival networks in those states."

Under McIntyre's bill, federal, state and local governments would be prohibited from accessing a customers' financial records unless the government had the customer's consent, a reporting requirement legally authorized access or a subpoena or warrant for the records had been issued.

The Federal Reserve System's Board of Governors would write all disclosure regulations for financial institutions offering EFT services to their customers.

Finally, the proposed legislation would press automated clearinghouses (ACH) to allow thrift institutions to use their ACH services. Federal Reserve bank services would be withheld from an ACH if the ACH were not open to all financial institutions.

In addition, with the exception of the services they provide to ACHs, Federal Reserve banks and federal home loan banks would not be permitted to enter into the EFT business.

no W-2s next year?

If your 360/370, Burroughs or Honeywell Payroll software is not ready for the 1978 W-2 and SSA reporting changes, you could be unable to print any W-2s for next year . . .

Joe Nestor at (617) 851-4111 Wang Laboratories, Inc., Lowell, MA 01851 can tell you more . . .

WANG

COMPUTER FACILITY DESIGN.

Because it's vitally important to design and secure your new computer center correctly, let's do it right!

We're a professional firm of management consultants and security engineers. We have helped over 300 major companies provide secure operating environments for their data processing installations.

As specialists in computer facility design, we have spent over $1 million in research benefitting the owner/architect in the development of plans and specifications for an overall security system. We provide general floor plans and construction details. We design environmental controls, fire protection and security systems, including perimeter security. And we develop final engineering drawings and system specifications suitable for inclusion in the contract/bid documents.

Avoid problems before you build them. Contact J. C. Matlock, Jr., Dept. C, 235 Northeast Loop 820, Hurst, Texas 76053, (817) 589-2244.

DATA PROCESSING SECURITY, INC.
Atlanta Chicago Dallas/Fort Worth Los Angeles New York Washington, D.C.

Opens Competitive Bidding

County Revokes OK of Sole-Source IBM Order

By Jeffry Beeler
CW Staff

BAKERSFIELD, Calif. — Nearly three months after approving the sole-source procurement of an IBM computer system, the Kern County Board of Supervisors here has admitted it erred and has agreed to let other vendors bid for the contract.

"We in government are human just like everybody else, and sometimes we make mistakes," Supervisor John Mitchell conceded, referring to the board's initial endorsement of the sole-source procurement.

The council's Oct. 18 decision to rescind a long-standing purchase order for an IBM 370/158 system marked an abrupt reversal in the five-man board's attitude toward competitive bidding.

Ever since it had approved the acquisition of the 370/158 during a budget hearing last July, the group had strenuously resisted suggestions from IBM rivals that it open the county's contract to competitive bidding.

Echoing the sentiments of Kern County DP director John Veon and his staff, board members had maintained that requesting and evaluating bids from rival mainframe vendors would seriously delay the acquisition of a much-needed supplement to the county's existing IBM 360/40. They also had insisted that installing a non-IBM computer system would create serious training and software conversion problems.

Opposition Crumbled

In early October, however, the board's opposition to competitive bidding suddenly crumbled when T.H, Busby of Univac's Southern California Public Sector wrote the group a letter informing it of the IBM 3031's availability and adding that "if the county had waited one month, it would have been able to procure a new machine [and] would have saved at least 37% on the purchase price."

Busby's letter reached the supervisors nearly a week before Veon's office issued a similar warning, and its contents earned the DP department a sharp rebuke from the board members. "We were very concerned that someone outside the county government could notify us of a potentially cost-saving alternative to the IBM 370 before our own data processing department did," Mitchell explained.

That concern, however, apparently has not shaken the board's confidence in the DP department's competence or integrity. In fact, when it scrapped the original purchase order for the 370/158, the board immediately appointed Veon and his staff to write specifications for an alternative computer system.

Mitchell and his colleagues expect to see the results of the department's work by the end of the month and then send bid requests to several as yet unspecified computer vendors.

Local Univac representatives Len Vinson and Phil Mitchell, on the other hand, charge that Veon and his staff deliberately misled the board about the technical capabilities of non-IBM computer equipment. "They (the board of supervisors) were supplied with totally inaccurate product information," Phil Mitchell complained.

Both Univac representatives also accuse Veon and his colleagues of being biased in favor of IBM, and Vinson has expressed fears that the DP department's upcoming product specifications will reflect that alleged prejudice.

John Mitchell dismissed those fears as unfounded and added that he "had no reason to believe" that Veon and his staff had ever intentionally fed the board faulty technical information about IBM's or any other company's computer systems.

The controversy surrounding the DP department's alleged deception and vendor bias has helped fuel a continuing and often bitter contract struggle between Kern County officials and several IBM competitors, notably Univac.

That struggle has revolved around vendor efforts, until recently unsuccessful, to force the Board of Supervisors to consider alternatives to the 370/158.

The roots of dispute here can be traced back to an April board meeting when Veon first advised the supervisors to opt for a sole-source procurement. In a detailed memo outlining his position, Veon argued that his department's growing DP workload had forced the county to acquire an additional computer system as soon as possible and that competitive bidding would seriously delay the installation.

Univac's representatives, however, were less than enthusiastic about Veon's proposal. Although neither Vinson nor Phil Mitchell disputed the legality of Veon's recommendation — in Kern County, as elsewhere in California, computer systems qualify as personal property and thus are exempt from the competitive bidding requirement — both men questioned the reasoning behind the decision.

They also insisted that Univac could offer the county a single 90/80 or a dual 90/60 with the same capabilities as the 370/158 but for $1.7 million less.

ON - LINE PROGRAM MAINTENANCE FOR DOS and DOS/VS USERS

Shadow II has rightly gained the reputation as the industry leader in TP Monitor software.

Not only is is the fastest, most efficient and easiest-to-use TP system in the world, but we have now introduced the finest Source Program Maintenance System as a standard Shadow II option. (The OS SPM version is due to be released in November).

Shadow / Quota provides high performance Library files, all necessary on-line functions, full batch back-up utilities, full security against loss of data, powerful editing, fast terminal response times, on-line print display and many other time and cost-saving features.

Return the coupon now for more information on Shadow II and Shadow / Quota.

Shadow II
The World's most advanced TP Monitor
altergo

Altergo Software Inc.
Wellesley Office Park
55 William Street
Wellesley
Massachusetts 02181
Telephone: (617) 237-6132

Please send me information on Shadow II ☐
Shadow/Quota ☐

Name ____________

Title ____________

Organization ____________

Address ____________

Zip ________ Phone ____________

My computer is IBM ________ Op. System ______

Present TP Package ____________

Our need is ☐ immediate
☐ 3-6 months
☐ over 6 months

Hammer: DP Creating, Also Easing Complexity

By Esther Surden
CW Staff

SEATTLE — Although society becomes more complex daily, technology is continuing to develop the tools to deal with that complexity, Dr. Carl Hammer, director of computer science at Univac, told a recent conference here.

Computers — which may be part of the complexity problem — can also be a part of the solution, Hammer said. Each step in the explosion of information has been accompanied by a development in computer processing to cope with the problem, he explained.

"Several areas in this electronic technology race have clearly emerged to warrant our admiration — and concern," Hammer said.

The first of these areas is computational speed, and its history can be illustrated by looking at the history of the symbol "pi."

The Babylonians computed pi to two decimals; in 1596 it was computed to 35 decimals. Now pi has been computed 100,000 decimal places using an IBM 7090, he said.

Another area of advancement has come in reading and processing information. This can be illustrated by comparing the amount of information a person can read and digest, even after taking a speed reading course, with the amount of information a computer can digest.

But those speedreaders who can read up to 1 page/sec are "still pikers," Hammer said, since current DP speeds exceed the equivalent of 1,000 page/-sec, even for the average system.

Storage and Retrieval

Great advances have also been made in the areas of data storage and retreival, Hammer pointed out. DP systems can "remember millions of names. Not only have we greatly increased our ability to store such large data volumes, we have also made it easier to retrieve them."

This ease of retrieval has created concerns over protection of privacy which have lead to regulation and legislation, he said.

A fourth area of admiration is the ability of electronic systems to perform complicated algorithms "effortlessly," Hammer said. Man is not even in the contest when it comes to computing these formulas, he indicated.

Communications is another aspect of data processing that has been unquestionably speeded up by computers, according to Hammer. When Christopher Columbus discovered America, he didn't know where he was or by what miracle he got there, he said, and it also took a long time for the world to understand that North America was not India, but a previously undiscovered continent.

In contrast, when man landed on the moon, he knew exactly where he had landed, how he got there, when he would return home — and with electronic communications, everyone else knew, too, Hammer noted.

Finally, "we must recognize the superior ability of electronic systems to respond to interrupts. Computers can respond to interrupts on the milli-, micro- and now even nanosecond level. In contrast, the most a human could respond to is about two interrupts per second."

All of these developments have been "catalytic" because of their size. "The electronic age is also the age of gigantics," Hammer stated. All problems come in large sizes, and the magnitude of the problems is staggering, he added.

Although computer systems are an integral part of the problem, the technological progress made so far has been contigent upon the availability of computer power, he pointed out.

"I don't take the view that electronic systems are a panacea" for these problems, Hammer said, but noted that despite all the problems we are surviving . . . We haven't really bogged down."

Hammer Urges DPers to Meet National Needs

By Esther Surden
CW Staff

SEATTLE — The computer industry needs to explore the areas of computer science that will make the greatest contribution to the national need, Carl Hammer, director of computer science at Univac said at a recent conference here.

Effort should be invested in making data base management systems more functional, making man-machine interfaces more natural and developing better languages and better ways of producing programs, Hammer said.

The storage, maintenance and retrieval of data and information are "key" to efficient operations in society, making the management of the data increasingly important, he pointed out.

For that reason, the industry must push beyond the already existing relational data base system to include the concepts of fuzzy sets and associative processors, he said.

In the realm of hardware and interfacing, Hammer advised the industry to more beyond the present methods of interfacing with a system. Presently man interfaces with the computer visually via a CRT or tactilely via a keyboard.

The third channel for interfacing — the audio channel — is not used, he noted. Voice recognition and natural language translation and processing methods should be developed, he urged.

(Continued on Page 9)

'VSERV'
CUTS DISK SPACE WASTE

VSERV, a VTOC Service Utility, solves disk management problems of identifying wasted disk space under DOS and DOS/VS. VSERV provides graphic mapping facilities and VTOC access capabilities. Powerful VTOC manipulation commands are supplied to graphically DISPLAY a VTOC, CREATE, DELETE, UPDATE, RENAME or TRUNCATE one or more files. VSERV allows instant identification of free space, under-blocked and over-allocated files.

User tailored default and security options provide against unauthorized use of the VTOC manipulation commands. A complete audit trail for historical use is provided. VSERV is an invaluable tool in VTOC recovery situations.

VSERV provides all of these capabilities for a one time purchase of $550. Join over 50 satisfied users on all types of direct access devices. Order VSERV today on a 30 day free trial, simply clip and mail the coupon below.

VSERV

VTOC UTILITY SYSTEM
- Graphic Pack Display
- Update, Add, Delete VTOC
- Truncate Files Automatically

30 DAY FREE TRIAL
OVER 50 USERS

Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, CA 91502
(213) 763-5144

ONLY $560
total cost

ORDER VSERV TODAY

☐ Please send VSERV on 30 day free trial

☐ 800 BPI ☐ 1600 BPI

(Tel. No.)________

Configuration:
CPU ______ Op. Sys.______ Disc.______

Name
Organization
Street City
State Zip

Attention DEC Users!

FLEXLEASE™
Offers DEC Users More . . .

1: One year operating leases on Digital Equipment's systems
2: Conversion from operating leases to longer term leases up to seven years without penalty
3: Annual renewal at progressively declining rates
4: Rental credits toward purchase
5: Substantial savings over DEC's rates

Phoenix
Leasing Incorporated
180 Harbor Drive Suite 206
Sausalito, California
94965
Contact:
Dan Murray or
Gus Constantin
(415) 332-6280

Phoenix Leasing Incorporated, a major independent capital equipment leasing company, has a capital equipment portfolio valued at over $60,000,000. Phoenix Leasing takes pride in its strong financial condition, its innovative leasing programs and its record of efficiency and responsiveness in servicing its customers.

Antifraud Plan Meets Opposition

Mass. Welfare Wants to Tap Private Bank Files

By Ann Dooley
CW Staff

BOSTON — The Massachusetts Welfare Department has proposed a computerized system for matching names and addresses of welfare recipients with bank savings accounts records in an effort to crack down on welfare cheating.

Under federal and state regulations, most people with bank accounts would not be eligible for welfare.

The department's "saving" efforts are being thwarted, however, by the State Banking Commission, which so far has refused to cooperate on grounds that the system would be a potential threat to the privacy of all bank customers.

As proposed, the system would give the department access to all bank records.

The Banking Commission has no power to stop the Welfare Department from examining welfare recipients' records, since under Massachusetts law, the depatment can do so with the voluntary cooperation of the individual bank involved according to Deputy Commissioner of Banks Edward Flynn.

Officials of the two agencies have met to work out differences, but to date those meeting have been largely shouting matches, Flynn said.

He claims the Welfare Department is not concerned with privacy but only wants the cooperation of the banking industry so it can carry out its matching system.

Sumner Hoisington, deputy commissioner of welfare, admitted that getting the banking industry cooperation will be a "major effort" since it is a decentralized system and that the Banking Commissioner's help would be important to the success of the project.

But the Welfare Department also believes it is important to protect people's privacy and security, he continued. The department follows the guidelines of all current state and federal privacy laws, he said.

Flynn contends that the major problem is that even though the department says it is only interested in welfare records, it would have access to everyone's records, nonetheless. The Welfare people don't seem to realize the far-reaching effects unlimited access to those records could have, he added.

A file management system similar to the one that will be used for the bank accounts has been used by the Welfare Department to cross-check Administration and Finance personnel files, Social Security files and Division of Employment Security files and match them with welfare files, Hoisington said. No one has ever complained about the use of files in that system, he said, adding that when the program was first implemented, task forces were set up to study the privacy questions.

Matching is based on a name-address formula rather than the Social Security number, a spokesman said.

When a "hit" occurs, humans take over to analyze whether a discrepancy is actually illegal, he said.

Previously, the DP work was done by Urban Data Systems, but the Welfare Department has proposed handling the computerized bank record system itself, according to Steve Kane, assistant commissioner for assistance payments. It will give the department more flexibility and more immediate retrieval of data, he said.

It is estimated that 2% of the 116,000 Aid for Dependent Children (AFDC) recipients are ineligible because they have savings accounts larger than limits set by the state, Hoisington said.

That amounts to illegal claims of $7 million to $8 million per year, he said, commenting "we could use that $8 million very nicely somewhere else."

The meetings between the two agencies are scheduled to continue, although neither side seems optimistic about resolving their differences, according to Flynn.

Hammer Urges National Efforts

(Continued from Page 8)

"We do not yet communicate in a natural language with a computer, not withstanding the Cobolphiles who say Cobol is like English. I say it is as bad as my German accent," he contended.

Software is another area of concern to Hammer, who said the industry needs better and more systematic ways to produce it. Although structured programming methods have gone far toward improving software results, automated methods are needed to make software capable of holding up under internal and external operational and data errors.

According to Hammer, following up on these needed areas of development, computer scientists can best serve the needs of the nation by producing solutions to at least parts of the nation's problems.

Hammer hopes computer professionals will be thought of by future generations as people who gave "meaning and hope to the lives of millions who now live in disease, ignorance and poverty."

MVS.
Make it do what it's designed to do.

If you're planning to go MVS, we can help ease the transition. If you're already using MVS, we can smooth a good many of the rough spots in managing overall system operation

We are Capex Corporation. We make a program product for system management called PLAN IV:MVS. It offers solutions to DP problems not easily available anywhere else, from any other product.

PLAN IV:MVS provides the information you need to make your system perform at capacity. The information you need for management planning. For scheduling. For managing system services, controlling system resources. And it provides this information in a concise, readily usable form.

Information In Perspective

PLAN IV:MVS automatically monitors system operation. It spots bottlenecks and changes in operation before they can become serious problems. It puts information in perspective by means of its own historical data base automatically contrasting today with yesterday, this month with last.

It details the impact of changes. Makes management by exception feasible and workable. And, thanks to built-in trending, lets you see where you are now, and where you're heading.

PLAN IV:MVS provides the perspective you need to tune your system, quickly and efficiently. Workload balancing, IPS modification and other system tuning functions are brought quietly under control.

Proven Results.

Many of the most sophisticated MVS users around the world rely on PLAN IV:MVS to make their systems perform the way they're supposed to perform. It is the only system management tool that supports system management decisions at all levels, from evaluating turnaround time to channel loading, from TSO response time to target multi-programming. And because PLAN IV:MVS makes full use of built-in measurement facilities—SMF, RMF or RMF2, or MF/1—there's no costly overhead.

If you're using MVS, if you're thinking MVS, the next step is PLAN IV:MVS. It's the one way to make sure that your system gives you everything you're paying for.

To see how PLAN IV:MVS can help you, call or write us today.

Capex Corporation
2613 N. 3rd St., Phoenix, AZ 85004
Phone 602-264-7241 TWX910-951-1594
Offices nationwide: Atlanta, Boston, Chicago, Dallas, Los Angeles, New York, Phoenix
In Europe, contact GCS Products/London, Paris, Dusseldorf, Brussels, Rijswijk ZH

capex
CORPORATION

Capex Corporation Info Dept BL
2613 N 3rd St Phoenix AZ 85004

☐ Please send me more information on PLAN IV MVS
☐ Please contact me to arrange a demonstration

Name
Title
Company
Address
City
State Zip
Phone
Model
System ☐ MFT ☐ MVT ☐ VS1 ☐ SVS ☐ MVS

Farmer's Almanac Predicts Hard Winter Ahead

By Ann Dooley
CW Staff

DUBLIN, N.H. — What do a computer and a nail in the privy wall have in common?

The Old Farmer's Almanac, that's what.

The almanac uses computer calculations to help forecast the short- and long-term weather around the nation; despite such a modern innovation, however, it still has a hole in the corner so it can be hung on the privy nail.

A computer has been used for the almanac's weather forecasting for about the last 12 years, but that's a relatively recent development for the 186-year-old publication.

Every year the almanac predicts in rhyme the seasonal and daily changes for every part of the country, according to editor Judson Hale.

Although Hale wants to keep the almanac's method of weather prediction a secret, he indicated that data on sunspots, the electromagnetic field of the sun and the field's relationship to the earth's atmosphere as well as other variables are entered into Dartmouth University's time-sharing computer.

The system performs mathematical calculations and then Hale and two other almanac staff members make their predictions based on the numbers.

The daily forecasts tend to be less accurate than the seasonal forecasts, Hale admitted, but the overall forecasting is getting better all the time. The seasonal forecasts have an overall accuracy rate of about 80%, he said.

If the 1978 almanac and the computer equations prove accurate, the country could endure a winter similar to that experienced at Valley Forge 200 years ago. The weather will be colder than last year — continuously for the Northeast and intermittently as far west as the Great Plains.

The rest of the country will escape some of the cold, but Florida will freeze in December, according to the predictions.

Europeans Financing Study On Transborder Data Flow

LONDON — Six West European countries have hired a firm experienced in design and implementation of computerized data networks to undertake an empirical study of the socioeconomic impact of computerized data traffic across national boundaries.

West Germany, France, the Netherlands, Norway, Sweden and Spain are sharing equally in the financing of this study of transborder networks in West Europe, which will be performed by Logica, Ltd. here.

Logica designed and implemented the European Informatics Network (EIN) and the Dutch Communications Network (CNET).

The project supplements current efforts of the Organization for Economic Cooperation and Development (OECD), which is comprised of 15 West European nations.

An OECD symposium last month in Vienna addressed to various issues of international data flow concluded that information on existing application methodologies and on the nature of data being transmitted are crucial to an understanding of this activity.

Attempting to compile such information, the Logica project will examine four types of networks: public networks, community or shared networks, service bureau networks and selected networks of private international companies.

The project is especially concerned with privacy of personal data, such as credit information. It is expected to be completed in December.

Are Your DASD's Drowning
. . . in a Sea of Data?

DMS/OS the Wave of the Future
in Data Management

DMS/OS has recently become the most widely accepted data management system available. For controlling the every day problems associated with DASD maintenance . . . it is the wave of the future.

Here's why DMS/OS is now the number one data management system: it addresses major user problems; reduces DASD and CPU operating costs; user proven in supporting all DASD devices and operating systems; supported by DASD experts; well documented; easy to load, use and maintain.

The **BASIC SYSTEM** includes:

1. Management Reports
2. Archival/Retrieval
3. Data Set Retention Control
4. Migration of Sequential GDG's from Disk to Tape
5. Automatic Selective back-up/restore
6. PDS Management/Compression
7. Data Set History File
8. RACF Support
9. System Tasking
10. Self Diagnostics

SELECTABLE UNITS

1. VSAM Support
2. TSO Command Processor
3. DASD Space Billing
4. Mass Storage Support* (Real to Virtual Migration)
5. Volume configurator

DMS/OS supports all IBM 360/370's under MFT, MVT, VS1, VS2, MVS and VM.

Let DMS/OS save your DASD's from drowning in a sea of data. DMS/OS is available for a free 30-day on-site evaluation. Call or write today for a free brochure, functional overview or for your on-site evaluation. DMS/OS . . . the wave of the future in data management.

*MSS user group information available

SOFTWARE MODULE MARKETING
THE SUPERMARKET OF SOFTWARE

Crocker Bank Building/Penthouse 1007 7th Street Sacramento, CA 95814 (916) 441-7234 Telex SMMSAC 377-314 IN EUROPE: California Module Marketing, Ltd. c/o Country Formations, Ltd. 27 Kelso Place, London W. 8

Mom would be proud of you for picking a data communications terminal system from Trendata.

There's such a selection. Not only in terminals and peripherals, but also in financing arrangements. We offer a variety of lease programs, straight purchase plans, even rental packages. Easy. Convenient.

You deal with one company that guarantees the product and backs it with nationwide service.

You can start with a small investment in equipment and later expand to more capacity without going through a financial hassle.

Our lease and buy programs are just as flexible as our terminal systems. Our equipment is designed to fit your people, our financing programs to fit your pocketbook.

They're both time savers you can really bank on.

Applied Magnetics
Trendata
610 Palomar Avenue, P.O. Box 5060
Sunnyvale, CA 94086
(408) 732-1790

Our terminal lease or buy programs fit everyone's pocketbook

The secret's out.

Philips Business Systems, Inc. now offers the hardware, software, systems and organization to make your next step up in data processing a *pleasure.*

Our nationwide build-up in data processing systems has been one of America's best-kept secrets. Intentionally. We've kept a low profile while quietly installing some 5,500 systems in North America . . . while building and training an organization of professional sales, software and service people . . . and developing data systems that are among the fastest and easiest ever to be put "on stream."

30 days from sign-up to start-up

Take our new Visual I™ Electronic Accounting System, for example. In just *two days,* we can demonstrate how well it fits your business . . . using your *present* invoice. And how well it rapidly integrates with your present system for inventory control, general ledger, and many other management applications. Moreover, Philips Business Systems is ready to deliver, install and have your Visual I System operational in as little as 30 days! Because the experience we've gained during our thousands of data system installations has been built into every Visual I System. We have the software *NOW.* We have the hardware *NOW* and it's loaded with design features that will put a smile of satisfaction on the face of everyone who uses it. Philips Business Systems has the system that will make your entry to electronic accounting a pleasure.

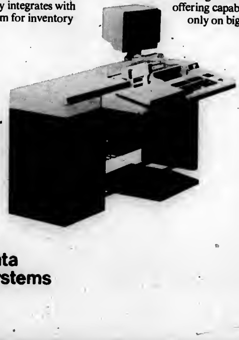
Large computer power in a compact mini

Our new Visual II™ Business Computer is making life a lot easier for companies who need data processing along with electronic accounting. It is truly a "mini with muscle," offering capabilities and capacity found only on bigger, more expensive systems. For example, it accommodates high level languages such as COBOL and RPG. Plus, it can handle multiple inputs and feed multiple output devices. Operating benefits include multiprogramming, spooling, job streaming, operator communications, performance logging, hardware/software interrupt, support utilities and random, sequential and dynamic file access. Visual II Computers are designed to meet all your business data processing needs *TODAY* and for a long time to come.

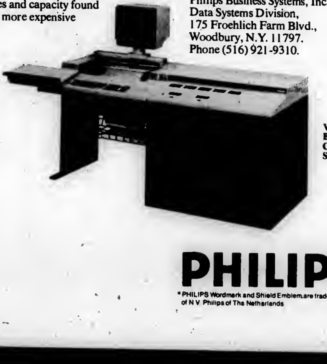
No doubt about it, our secret is out. But our patient, practical approach is already paying big dividends to thousands of organizations across the U.S. They've found that their next step upward in data processing can be an unexpected pleasure.

Get full details on these state-of-the-art systems. Call or write

Philips Business Systems, Inc.,
Data Systems Division,
175 Froehlich Farm Blvd.,
Woodbury, N.Y. 11797.
Phone (516) 921-9310.



Visual I™ Electronic Accounting System



Visual II™ Business Computer System

PHILIPS

Data Systems

PHILIPS*

* PHILIPS Wordmark and Shield Emblem are trademarks of N.V. Philips of The Netherlands

Students Answer, Evaluate Questions

System Changing Earlham Education Process

By Tim Scannell
CW Staff

RICHMOND, Ind. — Earlham College here is developing a computer-based conferencing system here that may make a new kind of learning possible.

Rather than serving as a calculator or tutorial machine, the system performs more like a telephone that students use to answer, question and evaluate and comment on essay examinations, according to Dr. Jerome Woolpy, coordinator of the project.

Based on a Digital Equipment Corp. PDP-11/70, the system is expected to improve communications between students and professors as well as among the students themselves, Woolpy explained.

The system is presently installed on a pilot basis. A typical student, during the course of a 10-week semester, is assigned a code number known only to him and the instructor.

When chapters are assigned to be read or a lecture is given, that student is not tested by the conventional paper-and-pencil methods, but rather through one of 10 terminals.

After keying in, the student selects a category from the assigned reading. He can then either ask a question, answer a question already submitted by another student or offer a comment.

His input on the terminal is restricted to 200 words and a text editor is available for final corrections.

If the student chooses to answer a question, he has the option of rejecting those he feels are not suitable. Since grades are based not only on the evaluation of answers but also on the significance of questions, a student must become a good "teacher," Woolpy said. This prompts him to consider the subject matter differently.

In a comment, a student assigns a point value from 1 to 10 to the input from other students. Comments, are, however, not included in grade evaluation.

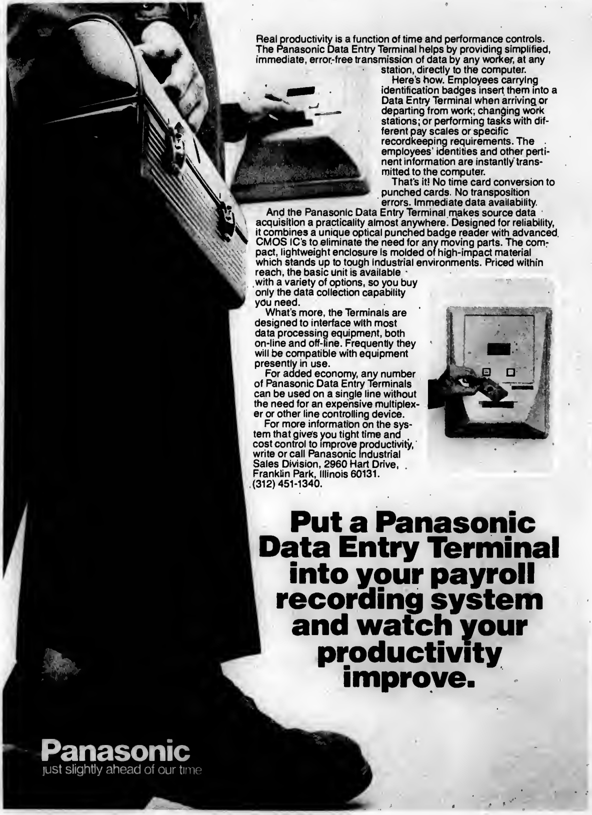
Whatever is entered through a terminal is available to all students for consideration and eventual feedback; the terminals have a reported retrieval time of 1 second.

Anonymity Promotes Honesty

Woolpy believes the system can prove to be an invaluable aid. Not only does it give the student a larger role in his own education, but it gives the instructor a clearer view of his class because he can track an individual's progress.

The anonymity involved, he added, also promotes a more relaxed and honest atmosphere.

The project, funded by a $124,000 grant from the National Science Foundation, will continue for 24 months.



Real productivity is a function of time and performance controls. The Panasonic Data Entry Terminal helps by providing simplified, immediate, error-free transmission of data by any worker, at any station, directly to the computer.

Here's how. Employees carrying identification badges insert them into a Data Entry Terminal when arriving or departing from work; changing work stations; or performing tasks with different pay scales or specific recordkeeping requirements. The employees' identities and other pertinent information are instantly transmitted to the computer.

That's it! No time card conversion to punched cards. No transposition errors. Immediate data availability.

And the Panasonic Data Entry Terminal makes source data acquisition a practicality almost anywhere. Designed for reliability, it combines a unique optical punched badge reader with advanced CMOS IC's to eliminate the need for any moving parts. The compact, lightweight enclosure is molded of high-impact material which stands up to tough industrial environments. Priced within reach, the basic unit is available with a variety of options, so you buy only the data collection capability you need.

What's more, the Terminals are designed to interface with most data processing equipment, both on-line and off-line. Frequently they will be compatible with equipment presently in use.

For added economy, any number of Panasonic Data Entry Terminals can be used on a single line without the need for an expensive multiplexer or other line controlling device.

For more information on the system that gives you tight time and cost control to improve productivity, write or call Panasonic Industrial Sales Division, 2960 Hart Drive, Franklin Park, Illinois 60131. (312) 451-1340.

Put a Panasonic Data Entry Terminal into your payroll recording system and watch your productivity improve.

Panasonic
just slightly ahead of our time

BULL

A quarterly compendium of computer satire, irrelevant nonsense, and outright lies.

Issue No. 3 of the General Bull news Sheet is out! 25 more pages of our finest, including such topics as:

- **The Ganeral Bull CDP Exam!** *Take our exam and earn the industry's most prestigious award!*
- **The Naw ED-S Course in Project Managemant! —** *Sign up for Advanced Arrogance Training, learn Hostility* **as a** *Management Tool, and so on!*
- **Join the Bull of tha Month Club!**
- **Raad Xaviara Hollerith's answers to your most intimate questions!**
- **Latters to tha Editor,** *Cartoons, and other worthless trivia! Even a couple of Real Advertisements!*
- **Absolutaly nothing educational, informative, timaly, or relavent!**

You probably didn't think we'd make it to Issue No. 3 or you'd have already subscribed by now, Right? Well, **GOOD NEWS!** . . . Its not too late.

Send $10 for a year's subscription (4 issues) or $3 for one issue to:

BULL, Box 2623
Menlo Park, CA 94025

DP's Status Seen Block to Data Base Success

By Jeffry Beeler
CW Staff

WASHINGTON, D.C. — If you plan to implement a data base, be forewarned. The chances of succeeding in your enterprise are not very good, Barbara Fossum said at a recent conference here.

In a two-hour technical session entitled "Data Administration," the Univac data processing consultant explained that the prospects of creating a successful data base might be better if DP departments occupied a higher place in the corporate hierarchy.

At most firms, however, DP managers exercise much responsibility but little authority. As a result, they lack a strong voice in shaping data base administration policy, she said.

Fossum criticized the common practice of administering data bases at the staff level. The people who are appointed data base managers are often technical types who are ill-equipped in temperament and training to deal with the human relations problems they soon encounter in their new positions.

More importantly, though, data base managers are often held accountable for administrative matters over which they have little direct control, Fossum added.

Committee Approach

A more effective way of administering a data base is to create a committee composed of a technical manager and a board of high-ranking corporate executives, she recommended. In most instances, these executives should be the heads of the major corporate departments such as marketing, finance and manufacturing.

In theory, this management-by-committee approach places the power to formulate data base policy squarely in the hands of the departments that will use the base. In practice, however, the technique works only when the committee members are given the authority to make and enforce decisions affecting their respective departments, she warned.

And even then, the approach sometimes falls, especially in large corporations, Fossum added.

Fossum outlined five steps that she recommended users follow to help ensure a successful data base installation.

First, one should educate oneself and all the managers who will be involved in creating and administering a data base, she said. Users should hire consultants and seek advice from competitive vendors who have been trying to gain a toehold in their DP shops. Users should tap the technical expertise within their departments.

She also advised users to talk with current data base users that are similar in size and function to their own companies, to listen to their experiences and to pay particular attention to any problems they may have encountered.

Second, users should prepare a detailed installation plan and should try to predict what could go wrong. If the department establishes a formal mechanism for solving problems and keeps a log of any installation difficulties it encounters superiors will be prepared if the data base fails, she explained.

Third, the manager must obtain a commitment from all the personnel who will be implementing, using and administering the data base, Fossum said.

Fourth, a position for a technical data base administrator must be created. Ideally, the person who occupies the slot should be "applications-oriented" and should interact well with users, she said.

Fifth, problems should be brought into the open and superiors should be kept informed of progress — or lack of it — at every step of the installation.

In creating a data base, objectives should include planning and implementing an overall information strategy, increasing data utility and — most difficult of all — cutting installation costs, she said.

Users of prospective data bases should also make sure their DP managers enjoy the same executive status as other corporate department heads, Fossum suggested. "DP managers often have a better feeling than anyone else for the structure and organization of their companies," she said.

Sly buy.

A CRT that costs more but actually costs less.

At $907,* our Perkin-Elmer Model 1100 CRT Terminal has been the price-performance leader in the CRT business for almost a year.

Recently, some CRT makers cut their prices to a few dollars below ours.

Don't be fooled. The Model 1100 still costs less. Here's why.

Program debugging takes less time.

You'll save the few extra dollars you spend for our CRT the first time a programmer uses it for debugging a program. The secret? A feature called Transparent Mode, which displays everything coming down the line – including control characters – and helps solve the most complicated host computer and communication link problems in seconds.

Operators make fewer errors.

You'll save money day after day with the Model 1100. Thanks to a 9 x 12 character matrix, the Model 1100 has crisp, clear, strikingly sharp characters. So operators see their work better and make fewer mistakes.

The Model 1100 also has a hooded display to eliminate reflection and end eyestrain. The display is right at eye level, too, which means no bending, no neck problems, and less fatigue.

All our standard goodies.

A big 12-inch screen, 128-character ASCII set, upper and lower case, Typamatic repeat on all keys, and a 24-line display are standard. The same goes for our exclusive No Hassle toll-free 800 number. One call gets you service. Where you need it. When you need it. Worldwide.

The Perkin-Elmer Model 1100. Feature for feature, it still costs less.

PERKIN ELMER DATA SYSTEMS | TERMINALS DIVISION

Randolph Park West, Route 10 & Emery Ave
Randolph, N.J. 07801
(201) 366-5550, TWX 710-987-7913

(617) 890-1305 Boston, MA
(312) 437-3547 Chicago, IL
(214) 234-8880 Dallas, TX
(714) 544-9093 Los Angeles, CA
(201) 229-4040 Oceanport, NJ
(408) 249-5540 San Francisco, CA

*Quantity 75.

T'S GUARANTEED

LIB/OL is a full-service product.
SPM comes as is.

SWITCH NOW!

. SEE PAGE 3.

Framingham inmate demonstrates how to change a circuit breaker on computer printer as Honeywell's Richard N. Henderson looks on.

Training Program for

By Tim Scannell
CW Steff

FRAMINGHAM, Mass. — A DP education program initiated by a vendor for inmates of the Massachusetts Correctional Institute (MCI) here marked its 10th anniversary recently.

The program, which teaches keypunching, computer operations, programming and maintenance, offers "hands-on" experience to prison residents through the use of a Honeywell Information Systems, Inc. Series 200 computer. Between 1968 and 1972, inmates associated with the endeavor have provided more than $2 million in services to such state agencies as the Department of Education, the Department of Natural Resources and the Division of Corporations and Taxation.

The entire program began in 1967 when an inmate of the prison requested computer programming instruction after seeing related want ads in a newspaper. His request was referred to Malcolm D. Smith, then a manager at HIS' Programming Development Group, who agreed to set up a program at Walpole, a maximum security prison, in June of that year.

HIS donated books, supplies and computer time, which in the first year cost the company no more than $2,000. Instructors for the courses were volunteers who received no remuneration for their activities.

In 1973, the top programmers from MCI Walpole and MCI Norfolk, other prisons where similar courses had been started, were moved to MCI Framingham, a minimum security prison. HIS provided them with their own computer system.

Despite the fact that the inmates cannot make sales calls on prospective customers, the senior programming group at Framingham has set up a service bureau business. Called Con'Puter Systems Programming, the business not only provides work experience and learning opportunities but, since the passage of a law in 1972, allows a prisoner to receive pay for the work he does.

One of the reasons the project is so successful, according to Smith, is that it is self-perpetuating. Two inmates are selected at the end of each class to give a small presentation at the next meeting.

Students are also required to teach new arrivals to the program and to prepare an instructor's manual at the end of their particular segment. These precautions were taken to assure the program would continue even if HIS instruction could not.

The program's dropout rate is fairly high. Of the 30 or 40 inmates that sign up for the program, only half are picked as qualified to continue on to more advanced skills.

The other half will eventually discontinue DP training, which consists of such basics as flowcharting and Cobol language introduction. Eight to 10, on the average, finally complete the course and dedicate themselves to the program on a full-time basis.

When a valid command card passes within 4 to 6 inches of a concealed sensor, the door is activated immediately. Command cards may double as employee ID cards and can be used to activate the Schlage system while remaining in a pocket or purse.

Consider the hidden alternative — Schlage Electronics Access Control System

Schlage Electronics introduces an access control system that not only eliminates the need for guards and conventional keys, but for card slots or pushbuttons as well. It's the "hidden alternative," the first practical application of electronics technology to control access for business, industry, even residential complexes. Easy to use and install. Regulates and records access by door, time and individual. The Schlage system operates by proximity. A hidden sensor scans a credit card-size command card and transmits signals to a control unit, which regulates access, and to a printer, which records access and attempts. You program the system to suit your needs. Planning and installation is as close as your nearest Schlage Electronics dealer, backed by over 50 years of security service. You can start solving today's access control problems by calling toll-free, (800) 538-1755. In California call (408) 736-8430.

SCHLAGE ELECTRONICS
A Schlage Lock Company
1135 E. Arques Avenue
Sunnyvale, California 94086
(408) 736-8430

MORE BPS

From . . .

OMNI-TEX

No EIA Option is Required for Your LA-36 Terminal With our 503A, C Acoustic Telephone Coupler!

It's just that simple and *very* economical. Just plug into terminal internal power, interface TTL through LA-36 main board connector J4, and you're on line at 300 baud! Operating mode is originate-only at half or full duplex controlled by terminal. For more information, call collect
(602) 252-2083
or write
Dept. 1114:

OMNITEC DATA
"New Dimensions In Modems"
2405 South 20th Street • Phoenix, Arizona 85034

Inmates 10 Years Old

Of the 650 or so inmates who have entered the program since its inception 10 years ago, nearly 400 have become proficient enough to get jobs as beginning programmers or computer operators, according to Richard N. Henderson, HIS' community services manager and current director of the program.

The 350 graduates who have been released from the institution not only have a number of professional successes, but a recidivism rate of 3% to 4% — a marked contrast to the estimated 70% nationally.

Henderson attributed the program's success to the "live" programming experience an inmate receives while in the program and the self-respect he has upon completion. Of course, he noted, some participants have obtained other types of employment upon leaving, but he feels their DP training was a factor in getting their first jobs.

Profits from Con'Puter Systems Programming have fully paid for the computer facilities at Framingham. The inmates pay all of their overhead, which includes electricity, a business phone and office and computer supplies.

Clancy W. Spangle, HIS president, is optimistic about the program and satisfied with its results. At a recent press briefing here honoring the program's 10th anniversary, Spangle said he feels that each inmate involved with the DP training program is learning a skill and not just being taught.

An inmate, Spangle said, cannot be rehabilitated, but he can be afforded the opportunity to rehabilitate himself. It is his hope other industries will follow HIS' example and initiate work/training programs at similar institutions, Spangle said.

In top photo, Malcom D. Smith (center) discusses report with inmates George Magrath (left) and Richard W. Quillen. Below, inmate-instructor teaches programming.

Keypunch instruction is given to inmate by another who has already mastered the basic course.

Telxon puts a family of data terminals in the palm of your hand!

If the successful operation of your business requires the fast movement of data from remote locations to your computer facilities—Telxon can help you:

The Telxon data terminal system offers telecommunication Accuracy, Speed, Convenience, Ease of Operation all at your fingertips.

TELXON 919 is recognized in the distribution industry as the finest cassette source data terminal available, particularly where large volumes of data must be collected and stored before transmission. 919 brings you:

- Proven Reliability
- Permanent Data Record
- Large Data Storage — 150,000 characters
- Wand Scanning
- Many Additional, Attractive Optional Features

TELXON WAND—Tells it all, does it all. Simply hold it like a pencil and you are ready to scan. Your Wand unit offers Plessey, UPC and Codabar scanning capabilities.

If you are now a Telxon equipment user you may upgrade to Wand scanning with a simple field modification.

TELXON 717 is a production and field proven solid state expandable memory data terminal. Check these solid reasons for adding Telxon's 717 to your data communications equipment family.

- Low Cost
- Solid State Reliability
- Ease of Operation
- Minimum Training Time
- Designed for wide range of applications, large or small

Upgrading your present data order entry system? Specify Telxon! This sophisticated family also speaks other existing data terminal languages, eliminating costly modifications. Let us show you how Telxon data terminals will easily fit into your present data communication facilities. Call or write Telxon; a representative is ready to show you, by demonstration in your location, how well this family of data terminals can help solve your data accumulation and transmission problems.

Telxon
CORPORATION
Headquarters: Houston, Texas

SYSTEMS DIVISION • GHENT SQUARE • BATH, OHIO 44210

Call 1-(800)-321-0516. In Ohio call 1-(216)-666-6751 (collect)

REDUCE OVER-HEAD

LIB/OL uses 60% fewer CPU cycles and EXCPs than SPM.

SWITCH NOW!

SEE PAGE 3.

Intel delivers PDP-11 memory for people who can't afford to wait.

When you're in a hurry for more semiconductor memory for your PDP-11, call Intel. We deliver memory for the full PDP-11 line. And because we're the largest manufacturer of semiconductor memory in the world, delivery is when you want it.

Why wait? Since you've chosen the leader to supply your minicomputer, it makes sense to go to the leader for memory, too. That's us.

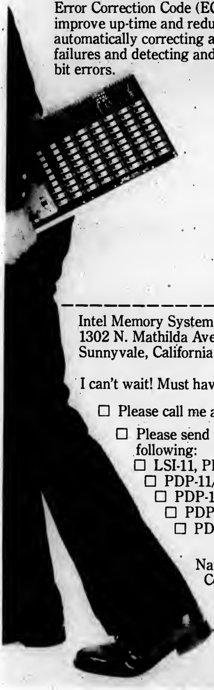
Intel memory systems save you more than time. Our in-1670 add-on memory for the PDP-11/70 is one example. It gives you four times the capacity in the same frame compared to the DEC MJ11-A core memory. And built in Error Correction Code (ECC) and Error Logging improve up-time and reduce maintenance time by automatically correcting and recording single-bit failures and detecting and recording double-bit errors.

For PDP-11 add-in memory go with our in-4711 plug in boards. You'll get memory that's even faster than DEC's. 16K words per hex-wide board. With or without parity. To further expand PDP-11 memory and reduce UNIBUS™ loading choose our in-4011 add-on. With memory management you can expand to 128K words in 16K increments. And since the in-4011 requires only one UNIBUS load, you get added system flexibility.

Get more memory for your LSI-11 and PDP-11/03 in less space with our in-1611 add-in memory. You get up to 32K words, in 8K increments, on a single, two-wide, board. That's up to eight times the memory you get with a DEC board.

When you can't afford to wait call us at 800-538-8476. In California and Canada, call 408-734-8102; x575. We'll save you time, and much more.

intel delivers.



Intel Memory Systems
1302 N. Mathilda Avenue
Sunnyvale, California 94086

I can't wait! Must have delivery in ☐ 5 Days ☐ 30 Days ☐ ______ Days

☐ Please call me at ______/____________________ Ext. ____________

☐ Please send me information on semiconductor memory for the following:

☐ LSI-11, PDP-11/03
☐ PDP-11/04
☐ PDP-11/05
☐ PDP-11/34
☐ PDP-11/35
☐ PDP-11/40
☐ PDP-11/45
☐ PDP-11/55
☐ PDP-11/70

Name/Title____________________
Company____________________Mail Station____________
Address____________________
City/State/Zip____________________

UNIBUS is a trademark of Digital Equipment Corp. Maynard, Mass.

intel MEMORY SYSTEMS

U.S. AND CANADA SALES OFFICES

ALABAMA
Gol-Ina-Co
Huntsville
(205) 881-9512
Glen White Asaoc.
Huntaville
(205) 883-9394

ARIZONA
Intel Corp
Phoenix
(602) 242-7205
BFA Corp
Scottadsle
(602) 994-5400

CALIFORNIA
Intel Corp
Sants Ana
(714) 835-9642
Intel Corp
Sunnyvale
(408) 738-3870
Earle Asaoc
San Diego
(714) 278-5441
MAC-I
Berkeley
(415) 843-7625
MAC-I
Cupertino
(408) 257-9680
MAC-I
Fountain Valley
(714) 839-3341
MAC-I
Woodland Hilla
(213) 347-1374

COLORAOO
Intel Corp.
Denver
(303) 373-4920
BFA Corp.
Denver
(303) 837-1247

CONNECTICUT
Intel Corp
Dsnbury
(203) 792-8386

FLORIDA
Intel Corp
Ft Lsuderdsle
(305) 971-7200
Intel Corp.
Orlando
(305) 628-2393
Col-Ina-Co.
Orlando
(305) 423-7615

GEORGIA
Col-Ins-Co
Stone Mountain
(404) 299-2138

ILLINOIS
Intel Corp.
Oak Brook
(312) 325-9510
Data Electronica
Chicago
(312) 283-0300

INDIANA
Data Electronics
Indisnapolis
(317) 784-6360

IOWA
Technical Reps Inc
Cedar Rapids
(319) 396-5662

KANSAS
Technical Repa., Inc
Olathe
(913) 782-1177

LOUISIANA
Col-Ins-Co
Baton Rouge
(504) 292-1755

MARYLAND
Intel Corp
Timonium
(301) 252-7742
Glen White Asaoc
Timonium
(301) 252-7742
Meaa, Inc
Rockville
(301) 881-8430

MASSACHUSETTS
Intel Corp
Chelmsford
(617) 256-4131
Computer Marketing, Inc
Waltham
(617) 890-1776

MICHIGAN
Intel Corp
Southfield
(313) 353-0920
Lowry and Asaoc., Inc.
Brighton
(313) 227-7067

MINNESOTA
Intel Corp.
Bloomington
(612) 835-6722
Data Electronica
Minneapolia
(612) 786-9666

MISSOURI
Technical Repa., Inc.
Hazelwood
(314) 731-5200

NEW JERSEY
Intel Corp.
Ediaon
(201) 985-9100

NEW MEXICO
BFA Corp
Albuquerque
(505) 292-1212
BFA Corp
Laa Cruces
(505) 523-0543

NEW YORK
Intel Corp
Hauppauge
(516) 231-3300
Intel Corp
Rocheater
(716) 328-7340
Intel Corp.
Poughkeepaie
(914) 473-2303
Measurement Tech., Inc
Great Neck
(516) 482-3500
T-Squared, Inc
Pittsford
(716) 381-2551
T-Squared, Inc
Syracuse
(315) 463-8592

NORTH CAROLINA
Col-Ins-Co
Winston Salem
(919) 748-0297
Glen White Aaaoc
Raleigh
(919) 787-7018

OHIO
Intel Corp
Dayton
(513) 890-5350
Intel Corp
Euclid
(216) 289-0101
Lowry and Asaoc., Inc
Cleveland
(216) 464-8113
Lowry and Aaaoc., Inc
Dayton
(513) 435-4795

OREGON
ES/Chase Co
Portlsnd
(503) 620-9616

PENNSYLVANIA
Intel Corp
Ft Waahington
(215) 542-9444
Lowry and Assoc., Inc.
Pittsburgh
(412) 922-5110
Q E.D. Electronics, Inc
Hatboro
(215) 674-9600

TENNESSEE
Glen White Aasoc.
Germantown
(901) 754-0483
Glen White Assoc.
Johnson City
(615) 928-0184

TEXAS
Intel Corp.
Dallas
(214) 241-9521
Mycrosyatems Mktg., Inc
Auatin
(512) 472-2492
Mycrosystems Mktg., Inc.
Dallas
(214) 238-7157
Mycrosyatems Mktg., Inc
Houaton
(713) 783-2900

UTAH
BFA Corp
Salt Lake City
(801) 468-6522

VIRGINIA
Glen White Aasoc
Lynchburg
(804) 384-6920

WASHINGTON
ES/Chase Co
Seattle
(206) 762-4824

CANADA
Intel Semiconductor Corp
of Canada
Ottawa
(613) 232-8576
Multilek, Inc
Ottawa
(613) 825-4553

EUROPEAN MARKETING HEADQUARTERS BELGIUM
Intel International
Brusaela
Tel (02) 660 30 10
Telex 24814

ORIENT MARKETING HEADQUARTERS JAPAN
Tokyo
Tel: (03) 426-9261
Telex: 781-28426

Individual Order Seen Basic Unit In 'Logistical Information System'

By Ann Dooley
CW Staff

NEW YORK — To be effective, an information system must control data in a way that assures the right product will be in the right place at the right time, according to Donald Kruszenski of A.T. Kearney, Inc.

That function is the key ingredient, he said at a recent conference here.

"The whole operation, which I call a Logistical Information System, should begin with each individual order and continue on that basis," Kruszenski said. The order should be considered the ultimate profit/loss unit, he said.

An effective system should include order revenue, manufacturing cost, order gross margin, transaction costs, order processing, inventory carrying, outbound freight and commissions and any other specific criteria, Kruszenski said.

This kind of system should consist of a host processing node, an intelligent controller and operational data sets and application terminals that would be the focal point for user activities, he said.

As the system is implemented in a distributed data processing (DDP) environment, central controls decrease and user responsibility increases, he noted.

A logistical information system would provide product availability and inventory reliability, order cycle times dependability and accurate notation of specific packaging materials, Kruszenski said.

Benefits of the system would also include flexibility, postsale support, pricing accuracy, invoicing on a complete basis, reduced order lead time, complete customer product information, faster credit reviews and increased cash flows, he said.

Implementation of a logistical information system in a DDP environment requires an integrated systems plan, education of management and selection of high-return area. During planning and implementation, results must be shown and goals reached one step at a time, Kruszenski advised.

Jerry Smith, senior manufacturing consultant to Rockwell International Corp., told the Info '77 audience about the actual conversion of Admiral Group, a division of Rockwell, to the type of system Kruszenski had described in theory.

The first step Smith undertook was to define Admiral's DP problems, which included a complex pricing structure, an inaccurate goods inventory, a manually oriented sales order processing system, high distribution costs, unrecorded sales and marketing analysis and cumbersome accounts receivable and cash applications.

The Admiral system was originally begun on-line but ended up in what amounted to a logistical information system, according to Smith. It included on-line sales order entry, real-time inquiry for availability and price and a real-time finished goods inventory control, he said.

It also included credit checking, on-line shipments reporting, on-line in-transit reporting and automatic invoicing, he added.

The hardware consisted of a Microdata Corp. 1600 Reality with an extension to make it more flexible, he said. It was networked from the host — an IBM 370/168 — with communication links to the two midsized Microdatas.

VOLUME
KEYPUNCH
SERVICE

DATA - MIDWEST
MINNESOTAS LARGEST
DATA ENTRY SERVICE
(612) 854-1800

Quality Data at Competative Prices
Keypunch • Keydisc • Typescan • OCR Processing

3050 METRO DRIVE - MINNEAPOLIS, MINN. 55420
A DIVISION OF DATA SYSTEMS INC

Short or Long Term
Leases From
RANDOLPH

370/138
370/148
370/135
370/145

...and all other 370's from 115's ... to 168's. CPU's or full systems. Up to 8-year lease available.

CALL THE 370 HOTLINE
800-243-5307

WANTED:
3420 Tapes: MOD 3's, 5's, 7's
135/145 Subleases or purchase
800-243-5308

Randolph Computer Company
537 Steamboat Rd., Greenwich, CT 06830
(203) 661-4200

Scouts at Jamboree Learn More Than Wilderness Survival Skills

By Denise Petski
CW Staff

MORAINE STATE PARK, Pa. — An exhibit provided by a vendor enabled more than 30,000 Boy Scouts who attended the 1977 Jamboree here recently to learn not only traditional wilderness skills, but also how to survive in a technological society.

Sponsored jointly with California State College, which offered a $1,000 scholarship to the scout who proved himself most adept at modern problem solving, the Univac exhibit gave scouts the opportunity for hands-on interaction with a computer and a chance to qualify for merit badges.

Nine CRT screens in the Merit Badge Midway at the Jamboree were programmed to ask questions; the scouts responded with information about themselves and their planned activities. One screen provided a continuous calendar of Jamboree events.

Overall response was very good, according to a Univac representative, who said long lines formed to enter the exhibit. The scouts participating in the computer exhibit received credit toward a merit badge in computer science as well as the special Jamboree merit badge offered by California State College.

Setting up an operational computer system in a tent posed some technological problems for Univac representatives, according to C.H. Riley of Univac's Pittsburgh office.

To provide the necessary temperature controls, the computer was housed in an air-conditioned van parked near the midway and connected by cable with the CRT screens. Computer fans were able to tour the van.

Scout gets hands-on experience at the jamboree.

Program Design, Data Base Courses Set in U.S. Cities

NEW YORK — Structured Methods, Inc. will offer courses on "Infotech/Jackson Design Technology," "Data Base and the Organization" and "Data Base Package Analysis and Selection" in several cities in the near future.

"Infotech/Jackson Design Technology," a procedure for designing, writing and documenting computer programs, will be offered Dec. 5-16 in Washington, D.C., Jan. 16-27 in Chicago and Jan. 30-Feb. 10 in San Francisco.

"Data Base and the Organization," aimed at management and senior technical professionals, will be conducted Dec. 5-7 in Chicago, Jan. 16-18 in San Francisco and Feb. 13-15 in Washington, D.C.

"Data Base Package Analysis and Selection" will be held Dec. 7-9 in San Francisco, Jan. 9-11 in Chicago, Jan. 23-25 in Washington, D.C., and Feb. 13-15 in Toronto.

The fee for each of the data base courses is $475; the design workshop costs $1,400.

Details are available from Structured Methods, 127 E. 59th St., New York, N.Y. 10022.

DIGITAL EQUIPMENT CORPORATION HARDWARE
+
SYMBOLIC® SYSTEMS SOFTWARE
= ONE HELLUVA SYSTEM

SYMBOLIC SYSTEMS®.

- DEC's *oldest* business OEM in the world
- For 9 years providing *turnkey* systems for business applications, process control and communications for various industries.
- Extensive experience with *RSX-11M*, RT-11, DOS, OS/8
- Experienced in *structured programming* techniques
- Can also provide just software on a *fixed price* basis.

For further information,
call, write or telex:

Frank J. Ponzio Jr.
(201) 277-6100/TELEX No. 13-6476
SYMBOLIC SYSTEMS INC.
25 Chatham Road Summit, NJ 07901

MANAGER PRODUCT MARKETING

GET INVOLVED

You will at Interdata, a major, pace-setting manufacturer of minicomputers, software, and integrated systems that combine modern architecture with the latest in practical large-scale integrated technology.

We believe that the Manager of our Product Marketing Group should insure that our Product Managers are completely involved in every phase of a product's development and marketing--from drawing board concept through the life of the product.

The management individual we are seeking will have several years' successful experience marketing E.D.P. products, and responsibilities that include planning and coordinating development/engineering marketing and merchandising strategies, pricing, scheduling product introduction, familiarizing staff members with features and capabilities of new products, preparing sales aids and documentation, and monitoring and trouble-shooting the progress of products throughout their lifetimes.

You'll enjoy an eminent income package and complementary benefits, and dynamic career mobility with a company that encourages and rewards involvement. For prompt consideration, please call 201-229-7007 or send resume including salary history to: Rod Lenniger.

INTERDATA®
A DIVISION OF
PERKIN ELMER DATA SYSTEMS
2 Crescent Place
Oceanport, New Jersey 07757

An Equal Opportunity Employer M/F

look into your future

Want to know more about a different approach to data entry? Ask these fine companies:

The Goodyear Tire & Rubber Company
GTE Data Services
O. M. Scott & Sons
Campus Sweater and Sportswear Co.
Dow Jones & Company, Inc.
Southern California Edison

They all chose Scan-Optics OCR Systems!

In scores of data processing operations around the world, experts have carefully evaluated OCR systems for data entry, studied performance/price ratios . . . and ultimately selected Scan-Optics Systems for accurate, high-speed page and document processing.

All S-O Systems operate off-line. We offer you OCR systems and ScanEdit™ Systems which provide optical character recognition and video processing/display capabilities integrated with key data entry functions.

Now's the time to make *your* evaluation.
Call or write:

SCAN-OPTICS, INC
22 Prestige Park
East Hartford, Ct 06108
203/289-6001

Brochure Provides Checklist

System Conversion Woes Can Be Eased: GAO

WASHINGTON, D.C. – The problems involved in modifying programs from other DP sites as well as converting to an entirely new CPU can be eased in a number of ways, according to a report from the U.S. General Accounting Office (GAO).

In a brochure entitled "Provisional Checklist for Software Conversion Projects," the GAO outlines questions that should be asked and answered prior to undertaking the conversion effort. The report also lists steps to take during planning, execution and followup of the project. The GAO prepared the brochure in conjunction with its report to Congress entitled "Millions in Savings Possible in Converting Programs from One Computer to Another" [CW, Oct. 24].

At the outset, an installation should decide when the applications must be in production on the new system and whether work will be done by inhouse staff, staff from other agencies or contractors.

Contracting can be attractive if skilled specialists will convert the software for a fixed price, the report observed.

Managers should also examine their software inventory and determine what can be thrown away and whether some software would be less trouble to write new than to convert.

In addition, they should look at the expected useful life of the old software. For instance, emulation might be a satisfactory answer if long use is not anticipated.

Looking at data and files inventory, the manager should determine what can be thrown away, what incompatibilities exist between the old and new systems' file handling capabilities and whether bridging software needs to be written to automate the conversion.

A detailed inventory of software files and documentation to be converted should be prepared, the report indicated.

Also, managers should look at alternatives to conversion, such as obtaining usable existing programs for the new system and/or rewriting the old software. "The old software may be so bad that it should be thrown away and completely new applications written for the new system," the report continued.

The next step is to plan the project.

Select a contractor experienced in conversion who will quote a fixed price and include lateness penalties and acceptance testing, the GAO said.

Look at the timing of the effort and determine if some useful preconversion can be done, the report said.

Another factor to consider is resource availability.

When assigning staff, the GAO recommends that team members be on the project full time.

The GAO recommends learning what automated conversion aids are available.

The planning phase should include an attempt to capture all possible information such as that from memories of project originators.

Execution Phase

The execution phase of the project should also include information capture and preparation of a schedule with definable milestones.

All the programs to be converted should be packaged with pertinent material.

The conversion effort should not involve redesign, according to the GAO.

Conversion should include documentation as an ongoing task. If possible, documentation should be captured in a machine-readable medium.

Last but not least, each program must be tested before it is released to production.

After the converted items are in production, the installation should immediately finish the documentation, the GAO said. It should keep results of test runs and ideas for future improvements.

TWO DATA BASE COURSES from
STRUCTURED METHODS, INC.

DATA BASE PACKAGE ANALYSIS AND SELECTION *a 3-day seminar*

Instructor: Stephen L. Robinson

This seminar provides the attendee with an understanding of the internal workings of how one defines, designs, uses and maintains a data base employing various data base packages. This knowledge, coupled with an organization's analysis of its data base requirements provides the ideal framework from which to select a data base package. The seminar will analyze, in depth, five of the most popular data base packages: IMS (DL/1), TOTAL, IDMS, ADABAS and S2000.

***Stephen L. Robinson**, who regularly writes the "Data base Corner" for Computerworld, has been affiliated with Performance Development Corporation (where he was Director of Professional Development), and CACI (where he provided educational and consulting services for data base projects). He has also lectured on data base for AMR International, the American Management Association, ACM and DPMA.*

DATA BASE AND THE ORGANIZATION *a 3-day seminar*

Instructor: Arnold Schron

This course is directed at those management and senior technical professionals who require a general understanding of data base and data base management systems. Substantial discussion will be allocated to the description of prime environments for effective data base implementation and the impact of data base on the organization. The major focus is on the Why, How-to and the Return on data base and data base management systems.

***Arnold Schron** has served a large, multi-divisional company in various technical and management positions including Manager, Data base Administration; and Manager, Marketing Information Systems. He was responsible for the application of analytical techniques to information data bases for marketing. Mr. Schron lectures on data base in the Computer Application Information Systems Department at the New York University Graduate School of Business.*

REGISTER NOW FOR ONE OF THE FOLLOWING SEMINARS:

DATA BASE PACKAGE ANALYSIS AND SELECTION
Dec. 7-9, San Francisco, Ca.
Jan. 9-11, Chicago, Illinois
Jan. 23-25, Washington, D.C.
Feb. 13-15, Toronto, Ont., Canada

DATA BASE AND THE ORGANIZATION
Dec. 5-7, Chicago, Illinois
Jan. 16-18, San Francisco, Ca.
Feb. 13-15, Washington, D.C.

Fee: $475.00 includes materials, lunches and coffee breaks. 10% discount for groups of three or more. 10% discount for payment in advance of 21 days.

For more information or to register, send the coupon or call (collect): (212) 753-4450

STRUCTURED METHODS, INC.
127 East 59th Street New York, N.Y. 10022

☐ Please send more detailed information on ______
☐ Please register me for the ______
on ______ in ______
Name: ______
Title: ______
Company: ______
Address: ______
City: ______ State: ______
Zip: ______ Phone: ( ) ______
☐ Bill me ☐ Bill my company ☐ Payment enclosed

FEWER STROKES

LIB/OL users type less and get more than SPM users.

SWITCH NOW!

SEE PAGE 3.

Editorial

Time to Face Reality

Little talk is being heard these days about a total rewrite of the 1934 Communications Act. Instead, members of the House Subcommittee on Communications seem to be concentrating on the primary instrument concept, which would require that the first telephone or other carrier davice at a user site be suppliad by the local telephone company.

The primary instrument concept is not new. It was proposed some time ago by the telephone companies as an alternative to the connecting arrangements.

Only after the Supreme Court refused to consider the Federal Communications Commission (FCC) ruling on certification and registration of customer-provided equipment did Bell change its footwork to try to salvage something out of the interconnection squabble.

Giving Bell the toehold of one telephone at a location in order to preserve some of its revenue and control over its own facilities is not necessarily wrong. It may, in fact, be a beneficial solution to at least one portion of the intarconnetion controversy.

But, in a larger sense, the user needs to know what will happen to the rights of those with customer-provided equipment. It appears that the Supreme Court decision not to get involved with the FCC registration situation has also taken away some of the impetus from AT&T's push for the Consumer Communications Raform Act.

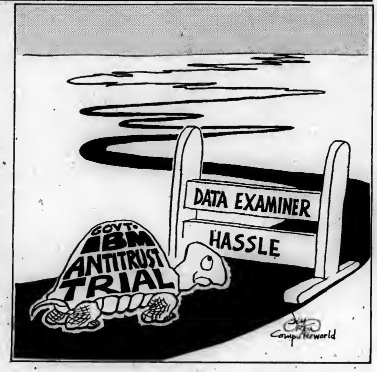
The House subcommittee should decide whether it wants to make communications and economics history with a Communications Act Rewrite or whether it wants to let the FCC go about its business of regulating the telecommunications carriers.

It may be that the congressmen have come to realize that there are very few votes directly connected with the issues raised by the Reform Act. The public at large cannot easily identify with a misnamed "consumer" bill that actually addresses the future of an important new industry.

Business telecommunications users have a vital stake in this controversy. They may not carry much political clout in the form of votes, but the companies they represent form the backbone of the gross national product.

Bell has lost the interconnection battle. More and more users have been enjoying the monetary and operational benefits associated with using noncarriar devices. It is too late for either the telaphone company or Congress to stem this tide.

It is time that both organizations face reality and turn their attention to more reasonable pursuits.



Data Past

Five Years Ago
Nov. 15, 1972

OAKLAND, Calif. — Hugh Jeffrey Ward pleaded guilty to a felony charge of stealing trade secrets after he was charged with tapping a time-sharing computer and stealing a program. Ward's employer, University Computing Co. (UCC) had been fined $300,000 in a civil trial in which UCC claimed the program was not a trade secret because its code was printed in a newsletter by Information Systems Design, Inc., plaintiff in the case and a competitor of UCC.

— — —

Computer-based voting systems proved successful for the most part in the previous week's national election. But even though most systems appeared to work up to or beyond expectations, there were few isolated cases where dampness slowed the card count and at least one case where it appeared that voters intentionally tried to "foul up" the system.

Eight Years Ago
Nov. 19, 1969

LOS ANGELES — IBM's Votomatic system was attacked at hearings conducted by the Los Angeles Elections Security Committee here. A witness who investigated the system testified that IBM knew its vote-counting system was not tamperproof and that the protective test "did not do the full job." The witness asked that use of the system be suspended.

— — —

PARAMUS, N.J. — Decision Systems, Inc. (DSI) announced a Cobol compiler for tha IBM 360/20 that required only 6K of memory and had capabilities similar to those of Honeywell's Cobol B. Claimed to be completely compatible with othar 360 Cobol compilers, the DSI Cobol operated under the Tape Programming System.

Letters to the Editor

Word of Encouragement

The "Apples and Oranges" editorial [CW, Oct. 24] touched upon a very frustrating problem, relating one line of computers to another. As was pointed out, this is difficult enough within one manufacturer's family. Crossing brand name boundaries is unreal.

I am far from sure that it is feasible to combine in one measurement both performance attributes that can now be measured by millions of instructions per second (Mips) and other attributes that can now be measured by throughput. However, I think it is desirabla to try.

I encourage Computer*world* to carry out the proposal stated in the closing paragraphs of the editorial. Good luck in your quest for a universally acceptable measure for computer system performance.

H.S. Beers Jr.
New York, N.Y.

What Could Be Simpler?

Concerning the editorial "Apples and Oranges" [CW, Oct. 24], the answer is software physics.

K.L. Kashmarek
Moline, Ill.

DP Managers Not All-Knowing

I am writing in response to "DP Departments Urged to Tell — Not Ask — Users What They Need," [CW, Oct. 24].

Joseph J. Carr's premisa that DP departments should tell tha user what he needs rather than ask him what he wants seams to me to be a giant step backward. For several years, thera has been a concarted effort in most DP shops toward becoming responsiva to the end user.

To presume that a DP manager knows as much about the user's particular business and problems as the user does may ba a serious mistake. A DP manager who possesses that leval of knowledge is indeed rare.

I think Carr's efforts to bring line managers into the ranks of computer professionals are a step in the right direction, as he may get user-oriented DPers as a result. Computer people need to be businessmen.

I also agree with Carr's goal of channeling DP effort toward those tasks that meet corporate goals. I'm not sure how he has become more knowledgeable in the area of corporate objectives than tha user managers, but I suppose in so doing he has precluded the need for a steering committee.

I may have taken Carr's remarks out of context, as I did not attend the session. If so, I apologize.

However, I do feel strongly that, in the end, the user must identify his needs and DP should respond to those needs.

James J. Nunnally
Denver, Colo.

Cross-References, Please

The article "Data Base Provides Business Model" by Frank A. Dottore [CW, Oct. 31] was very interesting. However, the article bears a striking similarity to a portion of the article "What Data Base Isn't" by Daniel S. Applaton, which appeared in *Dotomotion* in January 1977.

In future editions, CW should cross-referenca related, previously published materials.

Dennis J. Broderick
Buffalo Grove, Ill.

Dottore acknowledges that others may have published thoughts similar to his, but he was unaware of Appleton's article. The ideas in the CW article are a distillation of an article Dottore wrote in 1973 after a data base study at Xerox. That article was published in a Xerox technical newsletter then. Ed.

Readers Disagree on Degree Requirement

The Human Connection

By Jack Stone
Special to CW

Regina Litman's letter in this column [CW, July 4] triggered quite a response from the readership. This and the subsequent column complete the four-part series on the issue of college degree requirements for data processing personnel. I'll present reader opinions; both pro and con, in each article.

Steve Turek, a programmer/-analyst with the Kansas City, Mo., municipal court, claimed that the ability to learn is a characteristic of the DP job and the degree tends to establish the existence of that ability. He writes: "DP is an ever-changing field. Therefore, it would be good to hire people who can learn to do things in a different way. It is true a college degree will not guarantee an employer that the person hired will do a satisfactory job. However, if the job will require learning new concepts, then a college degree might increase the company's chances of choosing the right person."

Morgan Huff, vice-president and manager of the electronics department of Life and Casualty Insurance Co., said degreed people simply do better. "Why is it that people like Litman always cry bias and discrimination when others (people with degrees) get better positions than they? . . . People with degrees are usually better performers and thus are rewarded better . . . It's because these people have proven two things; they were willing to devote at least four years . . . trying to improve themselves and they had the intelligence to pass the minimum requirements for such a degree."

Anthony Mustapich, DP director for Mountain States Bankcard Association, said that the degree is desirable but not requisite. "A degree . . . should be no more than a 'preferred' element for certain entry-level positions. Degrees in other than business . . . or computer science would have even further limited value, as would a graduate degree. In hiring for positions other than entry level, work experience, job performance and aptitude for the higher level are what counts. My present staff (including management) is a mixed bag educationally. Most have at least some college-level credit, and the modal level is an associate degree. The key is that their performance on the job is not directly tied to formal education."

James Ward, manager of systems for a midwest firm, expressing the viewpoint of an employer, said he differentiates in his recruitment policies for programmers and analysts. He stated: "The decision to hire is always a risky one . . . I was once told that a person should never hire someone until after they've worked together for two years.

"With the exception of the point about the Certificate in Data Processing, all possible explanations mentioned (by Litman) for employer's preference for degreed individuals may have some validity. The fact is that there are always many applicants for any open position and the degree gives an employer some means of discriminating . . .

"I personally do not recruit entry-level programmers. Once a person has some work experience, he or she can be evaluated on the basis of their work product and capabilities. A degree in this case is not particularly relevant.

"I do, however, hire entry-level systems analysts. I am concerned with recruiting individuals who have well-developed interpersonal skills and business acumen . . . I feel that I am much more likely to find these skills among degreed individuals and, in fact, seek out people with advanced degrees . . .

"All other things being equal (which they never really are), superior educational credentials will always give a person an edge in both hiring and advancement . . . My advice to those who feel they are being held back through lack of a degree is to stop griping and go back to school. I know it's possible because I did it and now have two degrees to show for my efforts.

"One reason for not going back to school is that once they have obtained a degree, some people may have to find other reasons to explain their lack of professional advancement."

Finally, here is the viewpoint of a nondegreed operations manager who feels he is "dead-ended" without a college diploma. He complains that ". . . At the time of my last review, I was told I should not expect any further advancement unless I had a college degree. This made me stop and evaluate the situation. I am in my late thirties, a high school graduate, . . . and have been in DP for eight years, mostly in a supervisory or managerial capacity. I am self-taught in computer operations and programming.

"If I were to enroll in a degree program, it would take me seven to 10 years to obtain a B.A. degree. This is a long time to be "unpromotable," and because my employer is a progressive company, it could very well decide to replace me with someone more "promotable." That would put me up the proverbial creek.

Letters to Stone should be addressed to him at 2233 Wisconsin Ave. N.W., Washington, D.C. 20007.

Classifying Errors Can Ease Understanding

The Taylor Report

By Alan Taylor CDP

The complaint logs maintained on a typical data processing system are not particularly intelligible to outsiders — and you don't have to go far outside before someone becomes an "outsider" in this instance. Consider, for example, how often even the project manager has difficulty in understanding the situation shown by a well-kept set of error logs.

There has been very little work done on handling this aspect of computers, yet what seems to be needed is a clear and generally understood language regarding errors that would form a framework to facilitate understanding.

There seem to be only a few basic types of error produced by systems, so a common language is certainly possible. The two basic errors concern inaccuracy and unsuitability. A report may have a perfectly accurate entry, but for one reason or another it can be unsuitable for the system's users. And that is as much an error as adding two and two incorrectly.

For instance, if the purpose of the system is to locate service facilities to handle a crisis within one hour and the output shows a service facility that cannot be reached for six hours, then it is simply unsuited for the purpose.

A result might also be unsuitable if following the result can only lead to correct operations if different working methods are involved, or if differently trained people use the system, or when the ability to compare the meaning of today's output with previous history is impaired by the way the output is produced.

Probably these types of errors are more frequent than errors of inaccuracy.

In the same way that there are various types of unsuitability errors, there are also types of inaccuracy errors. An entry may simply be wrong, such as a town's name appearing where a balance forward should appear. It may be incomplete, such as a monthly statement that doesn't have all the entries on it. Or, it simply may be absent altogether.

A particular case of the "absent" type of inaccurate error is where the report concerned is late. Even though it turns up eventually, at the time it should have been present it was not.

Using this simple classification can help focus people's attention on both where something is in error and what alternative steps can be taken to handle the situation. (It does not deal with how the situation arose).

For instance, an error report saying that wrong information from a data base was given out on an inquiry for John Jones of 360 Roslyndale Blvd. when in fact there are two such people clearly falls into the "inaccurate" column so far as error analysis is concerned.

If inaccurate results occur — say a service call is sent to the incorrect address — the responsibility for producing accurate output must rest with the programmers and systems people. If, however, the information is erroneous through unsuitability, users must also be involved in considering whether to change the program, training, manuals or personnel using the system — or abandon the system altogether.

The problem of "false" errors — errors that are possibly not errors at all — has to be considered in any error logs. One philosophy is that there is no such thing as a "false" error, the output may be correct and as expected, but if it causes even a claim of error, then that is a problem.

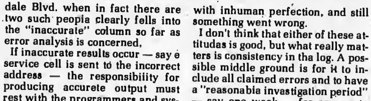
Another approach is to refuse to consider anything as an error until it can be shown in black and white that everything else was handled with inhuman perfection, and still something went wrong.

I don't think that either of these attitudes is good, but what really matters is consistency in the log. A possible middle ground is for it to include all claimed errors and to have a "reasonable investigation period" — say one week — for anyone to show that no error occurred. If someone does, the item is backed out into the unjustified complaint area. Really, each installation is on its own here.

We should adopt clean, common definitions of errors, keep track of them and watch the efficiency of methods used to reduce them. A few months or years of this tracked against system usage will give an understanding of the operational characteristics and safety quality of the system to anyone from chairman of the board to detailed maintenance programmer, and that is the type of common understanding we sorely need.

© Copyright 1977 Alan Taylor. Reproduction for commercial purposes requires written permission. Limited numbers of copies for non-commercial purposes may be made provided they carry this copyright notice. The views expressed in this column do not necessarily reflect those of Computerworld

The Families of Computer Errors



Pompous Verbiage Clouds a Good Thesis...

Reader Commentary

By George J. Lehman
Special to CW

Frank Binder's castigation of education in general, and DP education in particular ["DP Education Worthless in Everyday Use," CW, Oct. 3] was a marked departure from the jargon and Spartan prose normally encountered in your publication.

Grandiloquence, however, can never be a substitute for clarity of thought.

Binder's jeremiad — crafted in three languages none currently used — did little to raise the literary level of technical writing but much to qualify him for the honorific "The Mister Malaprop of Data Processing."

Extreme caution should be used when employing phrases like "semiliterate twit," especially when the same writer spews forth words like "paleantology" (sic) and phrases such as "a duumvirate of perdition." "Duumvirate" means the rule by two men: When Anthony and Octavian retired Lepidus, they transformed the Triumvirate into the Duumvirate.

Mixed Metaphor

Binder's misuse of the word qualifies him to place the three initials, MMM, after his name. In this instance they stand for "Master of the Mixed Metaphor." Semiliterate twit is not, perforce, limited to the third person.

Binder's mirth-heaving shoulders, one assumes, would have commenced to droop had he paid closer attention to the German exchanged between Explorer I and Sputnik: the German world for "we" is "wir," not "wier." They would have collapsed in total chagrin when a whippet of a first-semester Latin student pointed out that the plural of "deus ex machina" is "dei ex machinis," not his proffered (and totally erroneous) "deii ex machinae."

Classical education received in Europe? To paraphrase his colleague from Alabama, "Yuh can matriculate a muskrat at Goettingen, but that doan make him a polymath."

Act of Contrition

As an act of contrition, I suggest that Binder find some quiet corner at Air New England and there, like the errant Charles Bovary, devote himself to the conjugation of *ridiculous* sum. In penance, he can for three days personally debug all the core-dumps in his installation.

Admittedly, that is severe for a director of DP; however, if a Hohenstauffen emperor could be made to stand barefoot in the snow of Canossa for the same period of time, a truely [sic] contrite director can return to the cybernetic hog-slopping of "base plus displacement."

The unfortunate result of

(Continued on Page 23)

UP YOUR PERFORMANCE

with the

EDP PERFORMANCE REVIEW

A monthly review of techniques and methods, products, literature and services to help EDP management achieve maximum productivity.

- **Tutorial Reports**
- **Products & Services**
- **Current Literature**
- **User Experiences**

Subscription: $48.00/year. Write now for a free sample issue and index.

Applied Computer Research
P. O. Box 9280
Phoenix, AZ 85068
(602-944-1589)

...But 'Speech Surgery' Stunts Imagination

By Frank K. Binder
Special to CW

I have saveral points to maka regarding George Lehmann's critiqua of my Oct. 3 contribution to Computerwold.

First, I listened very closely to Sputnik's conversation with Explorer I, that's how I found out that Sputnik had a very heavy Russian accent. Hence the "wier" instead of "wir."

Second, 'Duumvirate" imaginatively translated is a rule of two, thus is rather properly used when emphasizing only two possibilities. This is cartainly much mora acurate than tha constant improper usa of tha world "consensus."

Finally, I knew 38 years ago, when I was a whippet of a first-semester Latin student, and I still know today that it is "ex machinis." Had I any doubt, tha oftan-used "ax libris" would have been a sufficient reminder. The "ex machinae" was a direct quote from an interview with a CPA and self-ordained DP expert. My secretary omitted the quotas.

Sha also misspelled "palaontology," hardly worsa than spelling "truly" as "truely."

Reader Commentary

Tha editors of Computarworld also changed my 'modus bibendi' to 'modus vivendi.' It somewhat defanged my intended satiric flavor, yet it has never baan my intention to shoot a horse because of an occasional stumble.

I'm glad Lehmann and I agree in principle. As for an over pedantic approach to languages, speach surgery only stunts tha imagination.

Binder is director of data processing for Air New England in Boston, Mass.

Clouds Hide Good Thesis On Learning

(Continued from Poga 22)

Binder's pomposity is that it obscures the validity of his premise: Education is generally abysmal, and DP education generally worthless. Had he concentrated upon those themes, he would have performed a valuable service.

As it was, however, he merely used them to flaunt his stilted prose and wallow in rhetorical puffery. How unfortunate! In his attempt to show us everything he knew, he showed too much: He demonstrated how superficial was much of his erudition.

In Words of St. Jerome

There is a point of balance, and it is to be hoped that in the future Binder might hearken unto the words of St. Jerome: "Sicut *enim a perfecta scientia procul* sumus, *levioris culpae arbitromur saltem* porum, *quam* omnio *nihil dicere.*" (Remote as we are from perfect knowledge, we deem it better to say too little rather than nothing at all.).

Lehmonn is a DP consultont in privote proctice in Hollywood, Calif.

Look Dad, one hand.

The Xerox Executive Printout. In the old days, there was nothing anyone could do about big, clumsy, hard to read computer printouts. Because that's all there was.

But, today it's different. With the Xerox Executive Printout you get letter-size reports that are as easy to read as they are to hold. And all because of the Xerox 1200.

The 1200 works either on or off line, quieter and a lot faster than clattery old line printers.

It eliminates bursting, decollating and special binders. And you don't need preprinted forms. Because overlays let you print forms and data at the same time.

For more information on the 1200 Computer Printing System, call 213/679-4511, Ext. 2409, or write Xerox, Dept. A1-15, 701 Aviation Blvd., El Segundo, CA 90245.

With the Xerox 1200 you not only save time, money and space, but you also have one hand free to pat yourself on the back for getting one.

Xerox Computer Printing

XEROX

XEROX® is a trademark of XEROX CORPORATION.

AKD now we're...
AMERICAN
KEYDATA
"QUALITY AT LOWER COST"
(402) 392-2606
Formarly Americana Key Punch, we've changed our name to reflect our increased service . . . now offering mag tapes with record lengths up to 1000 characters. But, we're the same people with the same dedication and desire to do a good job and meet deadlines. Remember when the volume is a problem, it's
AMERICAN
KEYDATA.
Mid America Plaza, Suite 144
7171 Mercy Road
Omaha, Nebraska 68106

That Comes in the Field

Teaching DP Nitty-Gritty Not Colleges' Job

Reader Commentary

By Temple S. Robinson
Special to CW

A recent Computerworld article that deplored the college-educated DPer was written as though every college student should be educated in the nitty-gritty of everyday operation.

This is not the purpose of a good university. The university teaches the language of the areas in which a student majors. In addition, it introduces him to the arts and languages of the world, showing him how to access the collected knowledge of the world.

When one takes a course in something with which he is familiar in a practicable way, it often seems the school is stupid. This is understandable, if one is familiar with the time span needed to gather knowledge, publish it and get it accepted by the academics. In a fast-moving technology that makes quantum leaps in a decade, it is impossible for the book cycle to keep up.

No university guarantees its graduates are the ultimate, nor should it. A lot of dedicated professors and scholars are trying to impart some of their accumulated knowledge to every student that comes under their wings.

Certain students always stand out in any discipline. This does not mean the others do not profit by it.

Not Trade Schools

There are some that would have our universities become trade schools. Please protect us from that. It is only the well-rounded person with a trained mind who contributes to the progress of technology and the world.

Some people can do this without the university — but not many.

The university, insisting on a broad spectrum, can turn out persons able to handle any job, with little additional training in the nitty-gritty. Expertise in a given technique should be acquired in the field.

The person with a university background is the one who can most easily understand the social impact of a new technology. The technicians usually have the feeling that their inside knowledge makes them the only arbiters of their trade.

Need for Compromise

The well-rounded person is aware of the compromises needed to interface the technology with the rest of the world.

It is the technician who wants to "reinvent the wheel" every time. He usually puts job insurance ahead of progress.

The university-trained person sees the need for common software and a systems approach to the job.

Buzzwords are bandied about on any job, where the "new boy" is trying to establish himself in a new environment. He uses this to boost his ego and overcome the cutting-down process of the technician, who feels superior because of his inside knowledge of a given operation.

The university is not blameless. It has to grab a new technology and build a curriculum to meet student demand. It has its failures, but is usually flexible enough to introduce change as needed.

It is almost impossible to get a person at the forefront of a technology to return to the classroom and teach. (Also, he usually is not a capable teacher.) It is therefore necessary for the staff to learn new skills and a new body of knowledge in a very short time.

I believe it is a duty of those of us who return for refresher courses to help the teacher with our knowlege, not to sharpshoot or deprecate the teacher because we happen to be knowledgeable in a given area.

To make the university really great, we should have people returning, at all times, for retraining. These people should be imparting their more current knowledge to the teachers.

In this way we can beat the book cycle and input knowledge more rapidly into the classroom.

One must not overlook the contribution of the language, linguistic and mathematics teachers (and writers) to the advancement of DP. It is their research and writing that has rapidly spread the word.

These dedicated people are the ones who should be praised, not damned, by the technicians.

Robinson, an airline pilot by profession, became interested in computers while assigned to a project on cockpit navigation. He now holds an associate degree in DP and is working toward a B.A., majoring in administrative computer science and minoring in accounting.

If you're upgrading to MVS (or *any* VS system), and are reviewing your job accounting and utilization reporting requirements, call us–collect.

Whether you are considering vendor supplied or in-house solutions, your research will not be complete until you include KOMAND in your evaluation. Not limited to just SMF, KOMAND puts you in control of the resources of your OS/VS system. KOMAND is cost conscious, flexible, and systems and operations oriented. Your KOMAND system can range from a $5900 costing and reporting module to a total system including formal invoicing, DASD track-hour accounting, and statistical analysis. (If you'd rather send in for brochures now and let us call you later, use the coupon below.)

KOMAND
BY PACE

OS/VS Job Accounting and Billing System

PACE Applied Technology, Inc. Telephone (703) 369-3200
7900 Sudley Road Manassas, Va 22110

Name________ Title________
Company________ Phone________
Address________
City________ State________ Zip________
Computer________ Operating System________

The PACE for Today...and Tomorrow

FOR SALE/LEASE
DEC LSI 11®
PDP 11V03 SYSTEMS
LA 36 DECwriters
LA 180 * VT 52
In Stock For
IMMEDIATE DELIVERY
Call: Glenn Burnett

UNITRONIX CORP.
1081 U.S. Hwy 22
P.O. Box 6515
Bridgewater, N.J. 08807
(201) 725-2560

Available Immediately For
SHORT TERM LEASE
370/138 370/148 370/145
3330's and OEM 3330's
360/30 360/40 360/50 360/65's
Greyhound Phoenix ICA's
CALL US COLLECT

United States		
Austin	Ron Gail	(512) 451-0121
Boston	Tom Ryan	(617) 272-8110
Chicago	Jerry Smith	(312) 298-3910
San Francisco	Dava Hyland	(415) 283-8980
International		
Canada	Don Maunder (Toronto)	(416) 366-1513
Mexico	Andres Contreras	(905) 543-6850
Eurasia (U.S. inquiries)	Don Haworth (Dallas)	(214) 233-1818
U.K./Europe	Joa Gold (Geneva)	(022) 61-27-54
Austro-Asia	John Hallmark (Dallas)	(214) 233-1818
Non-IBM:		
UNIVAC or)	John Hallmark (Dallas)	(214) 233-1818
CDC only)	Don Haworth (Dallas)	(214) 233-1818

GREYHOUND
COMPUTER CORPORATION
GREYHOUND TOWER, PHOENIX, ARIZONA 85077

DP's Position in Corporate Structure Shifted

By T.J. VanderNoot
And Rachel Bedford
Special to CW

A persistent theme in the literature of the data processing field is the ideal organization of the DP function internally — what structures are necessary or desirable for a DP department to perform its functions — and, externally, how the DP department should relate to the rest of the company or institution.

In 1967, the Japanese Computer Usage Development Institute studied 157 Japanese and 250 U.S. firms. In 78% of the U.S. firms, computer facilities were assigned to financial operations and reported through that chain of command.

In contrast, only 18% of Japanese firms reported through financial management.

During the past 10 years, DP has tended to move out of finance and into a more centrally oriented position in the corporate structure. A recent survey conducted by Syracuse University's School of Management found the proportion of DP departments reporting to financial management down to 59%.

At the same time, the proportion of departments reporting either directly to the president or executive vice-president or with a vice-presidential officer in charge of the department has climbed to 27%.

Reader Commentary

A hypothesis was advanced after the 1967 survey to explain why many more computer facilities reported to financial officers in the U.S. than in Japan. It was pointed out that the U.S. has had a longer history of automation, particularly with respect to unit record gear.

When computers came along, they were viewed initially as very large, fast unit record devices and were, therefore, assigned to the financial area.

Japan, however, had no such history of unit record systems and as computers began to appear, there was no prima facie reason for assigning the computer operation to any existing function.

For the Syracuse University study, 300 firms were selected from Fortune's lists of the largest firms and were sent a brief questionnaire. One indication of the importance many managers give to this subject is that 177 firms responded (59%), a very high response rate for mail surveys.

VanderNoot is president of Murroy, VonderNoot & Associates Ltd. in Ottawo, monogement ond DP consultonts. Bedford worked with the firm os a graduate student.

Letters to The Editor

What Did He Say? Only Lord Knows

I await Kenniston W. Lord Jr.'s promised articles on licensing and hope they will somehow clarify the first one of his series [CW, Oct. 17]. In paragraph 6 he wrote: "I was convinced that there was a problem and that licensing was a means of addressing the problem."

Without further reference to or definition of the problem, he said in paragraph 16: "I shall present one plan for addressing the issue in its entirety." But in paragraphs 8 and 13 he introduced two specific issues, whose relation to each other and to the problem were not stated.

Perhaps Lord knows what he is talking about. I don't.

David Ames
Watertown, Mass.

End the Effluvium

Perhaps the time has arrived for Ken Lord to find a new topic of interest outside of licensing and certification and for *Computerworld* to cease soiling its pages with his effluvium.

It is evident that the big push for certification and/or licensing emanates not from the bosses who pay the salaries, but from the "rational people" (hucksters) who foresee profits in fees for the exams and profits in the phony tutoring schools.

Mort Burdman
White Plains, N.Y.

NEW INFOSCI
WORKSHOPS
Reducing Software Complexity
Advanced Structured Techniques
Call "Jane" (415) 854-1567
INFOSCI INC.
Box 7117 Menlo Park CA 94025
[illegible]

SARA does wonders for your system.

SARA (Systems Analysis and Resource Accounting) is good medicine for anybody's system. It's the most comprehensive, versatile and cost effective computer performance and accounting system ever developed. Now SARA is being offered by BCS on a 30-day trial basis for a nominal charge. This is an excellent opportunity to diagnose your entire configuration. Mail the coupon today, or for faster action, call (703) 821-6275 or (800) 336-0135 (toll free).

Boeing Computer Services, Inc.
7700 Leesburg Pike, Suite 201 North, Falls Church, VA 22043

☐ Contact me regarding your 30-day trial.
☐ Send more information. My installation is (IBM, Honeywell, Univac, CDC) Specify ____________

Name ____________ Title ____________
Organization ____________
Type of Activity/Industry ____________
Address ____________
City/State/Zip ____________

The best reason to go outside.

BCS BOEING COMPUTER SERVICES INC

See us at Info '77...Booth 306

Bitslice and Waxworks Bring You

'Sounds of Computing' a Record for History

By Miles Benson
Special to CW

As the history of computing whips by at a nanosecond pace, few indeed are the computing buffs among us who can stand back, view that hectic pace dispassionately and contemplate recording the emergence of our new field for posterity.

The Sociology Of Computing

Think of it — a field born in the '50s, grown to maturity by the early '70s. That rapid growth must be documented in appropriate media before the memories of living through it slip away from us all.

It is in this spirit that the hypothetical record firm of Bitslice and Waxwords has brought out a new platter entitled "The Sounds of Computing." Destined to become a hit in computing circles, the record follows in the tradition of such other best sellers as "The Sounds of Sebring," "Steam Locomotives I Have Known and Loved" and "Exotic Bird Calls of Iran."

The opus is composed of three movements:

- *The 026 Keypunch:* — This is a real collector's item. The 029 may be newer, quieter and more efficient, but for sound buffs nothing can ever take the place of the old 026.

Listen as the 026 is switched on with a loud "click" at the beginning of an 8 a.m. shift and slowly accelerates into action under the practiced hands of a skilled keypunch person. The staccato rhythm builds to a climax at the 10:20 coffee break, then shatters as silence descends on the keypunch room.

At 10:30, listen carefully as the 026 begins punching Fortran source cards, then switches over to data input with a noticeable increase in punches per card and finally begins punching Cobol source with a nearly constant clatter of keys. Truly a nostalgic experience.

- *Pascal Time-Sharing Terminal:* — First time ever for this exciting new sound. Listen as the neophyte computer user sits down for his first time-sharing terminal session. At 1:05 into the session the system disconnects loudly because of a faulty charge number key-in.

Notice the striking similarity of the subsequent 1:05 to the preceding 1:05. A slow murmur of profanity precedes a new tempo as the system disconnects again and the terminal instructor takes over and keys in the proper sequence.

As the neophyte again takes over at 2:55, hear the interplay of the painfully slow user type-ins followed by rapid-fire system diagnostic responses.

What you are hearing is Pascal, a computer language especially well-suited to listening pleasure.

Notice at 5:17 as a faulty phone line causes a bad transmission and a resulting distorted rhythm of typing, followed by another system disconnect.

And in a strong climax, hear the excited talk of the user as he successfully receives the correct answer to his test program and types "BYE" in a thrilling intentional disconnect.

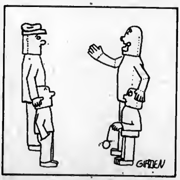
- *Checkout Session:* — Recorded on-the-spot during an all-night checkout session of a crash program. Excited voices and scratching pencils being applied to coding sheets make a cacaphony of sound to open the session. Hear first one, then another of the programmers spin off into wild improvisations on the basic theme of the program.

In a mounting frenzy, the program is readied for its first checkout run; time passes; we hear the programmers return, exhausted and discouraged, with the results of the first run.

Hear again the improvisations, each succeeding one growing less forceful as the programmer comes to realize that he, too, has not solved the problem.

And finally, in a beautiful tapering off of sound, the session lapses into three minutes of recorded silence punctuated only by occasional headscratching.

Rarely has the emotional nature of computing been better captured.



'Of Course, I'm Strict. I Believe In Raising Children With an Iron Hand.'

Data Center Operations Managers:
For Full Details On How You Can Expand Your Personal Career Development—Phone (609) 662-2070.

Far-sighted managers are turning to the new *AUERBACH Data Center Operations Management* for this very reason. But here are five more equally important ones for your consideration.

ADCOM is a PROBLEM SOLVER
This "how-to" information management service can show you how to better cope with daily problems Problems involving production management user interfaces, operations control, computer performance management personal professional development and more

ADCOM is a PROBLEM SAVER
It's a "fire-fighter"—through its use, you'll be able to anticipate systems problems before they actually occur, so you can avert time-consuming, costly stop-gap solutions Because of this you will become more valuable in your job more valuable to your company ***more valuable to yourself.***

ADCOM is UP TO DATE and EASY TO USE
Completely devoted to the professional needs of the data center manager, it is never out of date and easy to use In addition to your initial set of portfolios, bimonthly you'll receive 4-6 new ones to supplement the service and keep you well informed Each additional portfolio can be easily inserted into the unique AUERBACH indexing system, designed for easy access.

ADCOM is a MONEY SAVER
Not only can its information help your company save money in the long run, you can save money right now by taking advantage of our special pre-publication price of $150. Just fill out the attached order form and mail it to AUERBACH Publishers Inc., 6560 North Park Drive, Pennsauken, NJ 08109

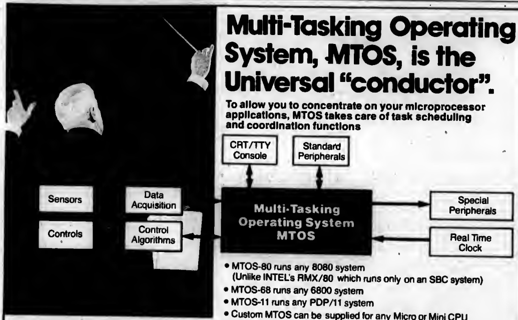
And for full details on how ***AUERBACH Data Center Operations Management*** can ***expand*** your personal career development call our special consultant Tom Miller at (609) 662-2070.

☐ **Yes! Send me *AUERBACH Data Center Operations Management* at the special pre-publication price of just $150. I understand I can return it within 15 days if I'm not fully satisfied and receive a full refund. (I realize the special pre-publication offer expires Dec. 31, 1977.)**
☐ **Bill me later.** ☐ **Enclosed is my remittance for $**________
☐ **Yes, I'm interested in *AUERBACH Data Center Operations Management*, but I want more information.**

NAME/TITLE ________
COMPANY ________
ADDRESS ________
CITY ________ **STATE** ________ **ZIP** ________
PHONE (Area Code) ________

CW/1177B

AUERBACH AUERBACH Publishers Inc., 6560 North Park Drive, Pennsauken, NJ 08109



Multi-Tasking Operating System, MTOS, is the Universal "conductor".

To allow you to concentrate on your microprocessor applications, MTOS takes care of task scheduling and coordination functions

- MTOS-80 runs any 8080 system (Unlike INTEL's RMX/80 which runs only on an SBC system)
- MTOS-68 runs any 6800 system
- MTOS-11 runs any PDP/11 system
- Custom MTOS can be supplied for any Micro or Mini CPU

For more information on the MTOS series, or our other software products and services, contact:
Software Products Manager

ipi Industrial Programming Inc.
Software Specialists Since 1963

9 Northern Blvd.
Greenvale, N.Y. 11548
516-621-8170

Apply Yourself

Computerworld will publish a special report on application packages in January, and to make it as useful as possible we'd welcome articles contributed by users outlining their experiences with package acquisition and use.

Many installations don't know what benefits they should realistically expect to gain from packages, how they should check out what is available before they buy, what kinds of problems they may encounter in trying to install and what kind of help they might get from the vendors..

These are the points we'd like to cover. You can help with manuscripts limited to about 1,000 words (four typed, double-spaced pages). Please send them by Dec. 16 to Don Leavitt, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

Package Designed to Tame Costs of Manufacturing

WOODLAND HILLS, Calif. — Costcontrol/80 has been developed to help IBM 360/70 installations in the manufacturing industry control investments in work-in-progress (WIP) and perpetual inventories, according to Informatics, Inc.

The system contains features for accumulation of actual and standard costs against work orders, WIP variance analysis, WIP and inventory valuation, labor distribution and purchase variance reporting.

Costcontrol/80 is the first product in a line of independent, functionally oriented software systems, Informatics said. The next one, according to the company's calculations, will be Shopfloorcontrol/80, intended to concentrate on work order release, scheduling and control.

Users were provided with insight into Shopfloorcontrol/80 last spring, however, when the Make Order Maintenance subsystem came out in May.

That phase of the whole operation will be joined by a WIP monitoring system, probably later this month, and by a package called shop paper generation and dispatching, expected to be issued shortly after the new year starts, a spokesman said.

Each of the software packages will integrate with Informatics' existing product line for manufacturers including, for example, Production IV.

The integration with existing environments — including data base management systems — has been made simpler, he said, by separating I/O operations into detachable subroutines.

Costcontrol/80, for DOS, OS and VS users, is written in ANS Cobol and will require 128K bytes in a DOS setting. It costs $25,000.

Shopfloorcontrol/80 will be in the $35,000 range, depending on the user's environment and subsystems selected, Informatics said from 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

Forecasts to 1990

Service Shows Industry Trends

CAMBRIDGE, Mass. — The Economic Advisory Service (EAS), an industry analysis, forecasting and consulting service designed to assist business and financial executives and government policy makers, is now available on General Electric's Mark III remote computing network.

Developed by Arthur D. Little, Inc. (ADL), the service is said to be the largest on-line system commercially available today for evaluating interindustry relationships and for forecasting the outlook for key industry sectors.

Technological and regulatory changes anticipated by the developer's economists and other experts are built into the forecasts. The service pinpoints purchase-sale relationships among major industry sectors and its query capability allows users to evaluate the implications of the possible changes, an ADL spokesman noted.

EAS also provides forecasts to 1990 of the growth rates for more than 220 industry sectors of the U.S. economy, primarily at the four-digit "SIC" level of disaggregation. Forecasts of the dollar flows from each industry sector to over 250 final demand expenditure categories are also provided .

Hard-Copy Reports

Short-term and long-term forecasts of U.S. industrial performance are available to subscribers both on-line and in hard-copy form. The short-term views are updated quarterly, while the forecasts through 1990 are updated annually, GE said.

An annual subscription to EAS, in addition to the cost of resources utilized on the network, is priced at $15,000, payable to Arthur D. Little at Acorn Park, Cambridge, Mass. 02140.

GE's network, available internationally, is headquartered at 401 N. Washington St., Rockville, Md.

Lighter Micr Loads Handled

DALLAS — Banks and other financial institutions with check processing volumes that can be handled with a single magnetic ink character recognition (Micr) reader/-sorter are the expected users of the Super Micr-SS package introduced by University Computing Co. (UCC) for IBM DOS and DOS/VS shops.

Effectively an enhanced subset of the older Super Micr-One and Super Micr-Two packages which UCC produced for multibank, multibranch operations, Super Micr-SS is said to minimize main memory requirements while providing facilities that maximize resource utilization.

Using departments have capabilities to control the capture, distribution and reporting functions of the Micr system operation, according to a spokesman. With on-line reconciliation, rejects may be reentered and input transactions balanced before posting.

The disk-oriented Super Micr-SS supports both the IBM 1419 and the IBM 2956 Micr reader/sorters and requires "approximately 80K bytes" of main memory depending on the amount of custom coding.

The package costs $25,000 on a permanent license, but lease plans are also available, the spokesman said from 8303 Elmbrook Drive, Dallas, Texas 75247.

Extel Micro Gains Sales Accounting

LONDON — Computer Analysts and Programmers Ltd. (CAP) has developed a sales accounting package for users of the Exchange Telegraph Co. (Extel) floppy disk Micro-File microcomputer system, which is based on an Intel 8080.

The package includes invoice extension and printing as well as statement preparation, according to CAP.

Maintenance of a balance forward sales ledger, including aging of the accounts on the ledger and monitoring of their credit levels, is another function of the package.

The sales accounting system requires an Extel Micro-File with 40,000 characters of storage, two disk drives with 300,000 characters each and a CRT-based terminal.

The equipment and standard software, including a Basic interpreter, is marketed by Extel and costs about $14,440. The sales accounting software alone costs about $1,805.

CAP is at CAP House, 14-15 Great James St., London WC1, England. Exchange Telegraph Co. is at Extel House, E. Harding St., London EC4 4HB, England.

Has it really been two whole weeks since you got caught with a hickey?

Congratulations, you've avoided the ABENDS once again—microscopic pieces of dirt and dust that eat up your computer time. But for how long? Keep ABENDS out of your system permanently with Computer-Link's complete Data Media Maintenance Systems. They quickly identify and correct tape, disc and ribbon problems, so instead of re-runs and crashes you get throughput. Our Tape Evaluator/Cleaner performs *five* tape evaluation tests to find the causes of more ABENDS than any other similar unit. And the Disc Inspector/Cleaner eliminates the causes of permanent disc errors anywhere in the field. For trouble free print runs, Computer-Link's Line Counter records only *printed* lines for optimum ribbon life.

Find out how much more reliable your system can become by filling out the coupon. Immediate detailed information is available by calling toll-free: **800-225-1616**, or in Massachusetts: 617-272-7400.

COMPUTER-LINK
CORPORATION
14 Cambridge St., Burlington, MA 01803

Please send me a brochure on:
☐ Tape Evaluator/Cleaner
☐ Disc Inspector/Cleaner
☐ Line Counter

Name__________
Address__________
City__________
Company__________

Swapping a 360/370 for a DEC can be a good deal. Hanging on to the IBM 1403's will make it a better deal.

Moving to a DEC System can make good economic sense. But if you're about to do it, just one word of caution. When you're evaluating your peripherals, be sure to hang on to your IBM 1403 printer. You know from your own experience that the 1403 gives you remarkable print quality. It's a proven performer that others have used to improve DEC System printing.

With the Grumman printer controller it's a simple matter to interface the IBM 1403 to your DEC system. Or, for that matter, to any other computer you might be considering. You'll not only retain the superior printing you're accustomed to, but continue to enjoy the extremely high reliability of the 1403. Best of all, the economics are right.

Remember, whether you buy, rent or lease our printer controller, we can provide efficient maintenance.

For complete information, contact your Grumman Data Systems representative. Or write or call Joe McDonough, Grumman Data Systems Corporation, 45 Crossways Park Drive, Woodbury, NY 11797, (516) 575-3034.

GRUMMAN

GDS 9 77
Printed in USA

Grumman Printer Controller.
The image maker.

Canada Digital Interface Ltd Tel (416) 231-3321
Nordic Countries: OY D H Wirkkala AB Tel 88 21 33
Great Britain & Ireland: Data Design Techniques Ltd Tel 01 903 6977.
Spain: CERO Tel 416 87 60/ 416 61 88
Switzerland & Austria Intersystems AG Tel 061/35 09 25
West Germany PeriData GMBH Tel 06196/81952

UCLA Adds To 'BMDP'

LOS ANGELES — An expanded packaging of Fortran statistical programs that have been generalized beyond their origins in biomedical data processing, BMDP-77 is available from the University of California at Los Angeles (UCLA).

At the same time, a revised manual from the University of California Press — includes descriptions of seven programs that have been added to the earlier BMDP packaging. This book is available separately, and might be a useful way for potential users to study the package, a spokesman suggested.

Life Tables and All

The new programs focus on life tables; derivative-free nonlinear regression; general (unbalanced) mixed-model Anova; log-linear analysis of multiway tables; missing data estimation by regression; Furnival-Wilson (all possible subsets) regression; and quasi-independent models of two-way frequency tables, he explained.

Since all the programs in the package are written in Fortran, they can be run on many different CPUs. In an IBM OS environment using overlays, the programs require 160K bytes, the spokesman said.

The programs cost $1,500 — with discounts available to government units, nonprofit organizations and universities — from the Health Sciences Computing Facility, UCLA, Los Angeles, Calif. 90024.

The manual costs $11.50 and can be ordered from the University of California Press, 2223 Fulton St., Berkeley, Calif. 94720.

Correction

In "Software Scene 'Diseased' But No Cures Near: King" [CW, Oct. 10], a sentence was omitted that noted David King was echoing ideas and phrases originally voiced by English consultant Michael Jackson at an Infotech conference in London in February.

King acknowledged his debt to Jackson and said his mentor's text will soon be available in Infotech's "State of the Art Report on Reliable Software."

Dumb Terminal™ is a trademark of Lear Siegler, Inc.

General Ledger System Gains On-Line Option

ANDOVER, Mass. — Software International has developed an on-line support package for use with its General Ledger and Financial Reporting System. The enhancement operates in DOS or OS environments under IBM's CICS, the vendor noted.

The support includes on-line editing of journal entries and adjustments. A generalized data entry utility allows the user to define screen formats for the IBM 3270 or any plug-compatible CRT terminal, according to a spokesman.

Since batch balancing is performed at the time of data entry, the problem of rejections occurring at posting time has effectively been eliminated, the spokesman stated.

Inquiring into any account to find such things as the balance at the last posting is another facility now available. In similar fashion, retrieval operations allow users to review the way accounts are related to one another or the formulas used to apportion charges, revenues and expenses, he said.

The basic general ledger system is said to handle any account numbering system so the user's accounting department can establish its own pyramid of accounts and alter the organization as it deems necessary.

The system can handle complex consolidations of subsidiaries with unlike charts of accounts that even include currency conversions.

The general ledger and financial reporting system costs $25,000 to $46,500 depending on features selected. The on-line capability is an additional $7,500 for DOS users or $8,500 for OS shops.

CICS has to be acquired by the user, Software International noted from Elm Sq., Andover, Mass. 01810.

Preparation of CRT Screens Eased by 'Deft' Software

JACKSONVILLE, Fla. — Screen programs for IBM 3277-type terminals can be written in high-level languages without dropping into macro-type facilities with the Display Entry Formatting Under TSO (Deft/3277) package now available from Generic Systems, Inc. (GSI).

Key to the support is a screen librarian which allows the user to create a format on a 3277 under a regular TSO user log-on, a GSI spokesman said.

The formats are created, modified and deleted independently of the application programs that use them, he added, explaining that the formats, once created, are stored in a library to be accessed by callable subroutines provided with the package.

These subroutines are called by the user's program to combine variable data with the format and to decode data typed in at the screen.

One advantage of this system, according to the spokesman, is that the analyst or programmer can create the format on the screen well in advance of developing the program to use it. The format can be viewed, and possibly revised, by the user as part of the system design phase.

Revisions can be studied almost immediately since their generation does not entail a program compilation.

While Deft/3277 is essentially the TSO environment, an additional set of subprograms is available to operate full-screen programs under a Tcam message handler, GSI noted.

The package costs $2,000 and can be ordered from GSI at 4251 University Blvd. South, Jacksonville, Fla. 32216.

Univac 1100 Cobol Tested

SPRINGFIELD, Va. — A summary report on how well a Univac 1100 series Cobol compiler stood up to government evaluation is now available from the National Technical Information Service (NTIS).

The validation runs were conducted by the Federal Cobol Compiler Testing Service to see how closely Univac's Ascii/Ansi Cobol Compiler Level 4R1 (Exec-8 Version 33R2) met the high-level implementation requirements defined in Federal Information Processing Standards Publication 21-1.

These requirements are based on ANS Cobol '74 and the validation summary report (VSR) on the tests is made up of several sections showing discrepancies found, NTIS explained.

The first section is an overview of the validation that lists all categories of discrepancies that might be found.

The final part of the VSR is a detailed listing of discrepancies together with the tests that were failed.

Although listed by the testing service as CCVS74-VSR-230, the report is cataloged by NTIS as AD-A042 837/5WC. It is "published" on microfiche only and costs $3 from NTIS at 5285 Port Royal Road, Springfield, Va. 22161.

Surprise! Your 1100 LPM Printer used up $100,000 worth of paper this year.

CPU capacity may be getting cheaper, but computer supplies certainly aren't. Our example is true. An 1100 LPM printer running at full capacity will put out some 700,000 pages per month, at a cost of five to ten thousand dollars! (Small wonder that the charges for paper are often the biggest "surprise" in your DP budget.) The need for protecting your DP investment — often at considerable expense — has also increased. And that's why we've devoted our December 26th/January 2nd special report to the many ways to stretch your supply dollars, and safeguard your computer system.

Edited by Ann Dooley, this report — titled *Supplies and Security* — will cover a wide range of supply problems, including everything from forms optimization to analysis of management utilization of DP-generated reports. Here are just a few of the areas to be covered:

- The changing supplies market — demands on the mini user
- An overview of DP media — what to look for, how to get it
- Pooling resources — how four companies share quantity discounts

We'll also look at the practical aspects of computer security in this report, with articles like these:

- Effective contingency planning — targeting danger areas
- Computer crimes and disasters — how to cut losses and minimize risk

If you're a DP Manager, MIS Director or Corporate Executive with responsibility for DP cost control and security, be sure to read the special report in our year-end combined issue. And if you market products or services that cut the cost of computing, or safeguard what's in the computer room — advertise in this report. Ad closing date is December 9. For details, call your Computerworld salesman. To reserve your ad space, call Terry Williams at (617) 965-5800.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Boston	New York	San Francisco	Los Angeles
Bob Ziegel	Don Fagan	Bill Healey	Bill Healey
Mike Burman	Frank Gallo	Jim Richardson	Jim Richardson
(617) 965-5800	(201) 461-2575	(415) 495-0990	(213) 475-8486

And that means the people in this car are pretty intelligent. Because they realize that the world's most popular video terminal is a steal at its new low sticker price of $895.

With a 24-line screen and 1920 bright, easy-to-read characters included as standard equipment, the Dumb Terminal™ makes you wonder why anyone would settle for second best. Especially when it's an asynchronous terminal with 59 data entry keys. And 33 positive action switches that let you activate functions like 1 of 11 different baud rates, an RS232C interface, or a 20mA current-loop.

The Dumb Terminal. Without thinking, it started a movement.

Lear Siegler, Inc., E.I.D./Data Products, 714 N. Brookhurst St., Anaheim, CA 92803; (800) 854-3805. In California (714) 774-1010.

Dictionary 'Cornerstone' of Data Management

By Henry C. Lefkovits

Special to CW

Professor E. H. Sibley stated in the foreward to the book *Data Dictionary Systems* (written by this author and published by Q.E.D. Information Sciences, Inc., Wellesley, Mass.) ". . . it is my contention, backed up by sad experience and horror stories, that the data base management system user needs a dictionary more than the data base system. All too many industrial (and governmental) users have found that their data base system was relatively useless until they implemented a good dictionary system: thus I label the data dictionary the cornerstone of good data management."

Experiences of the last few years support this theory and have demonstrated a clear trend in the availability of sophisticated data dictionary systems, as well as the ability of some users of these systems to derive substantial benefits from them. In a great majority of cases the use of a data dictionary system arose almost as a by-product of the use of a DBMS, and many users of DBMSs are beginning to find out that a data dictionary system is a prerequisite for the proper use of their DBMS.

Before discussing the uses of a data dictionary system, it is appropriate to present a definition. A data dictionary system is an information system in its own right containing information about an organization's data base. Given a data item, the data dictionary will contain information about its attributes and usage. It will not contain its value. This simplified definition will suffice for this article.

All Data Management

There is no reason why the use of a data dictionary system should be restricted to the environment of a DBMS. For data stored in conventional files the use of a dictionary system can be even more important. These files very often date back to the time when data, and the management of this data, was relegated solely to the discretion of programmers.

The proper use of a data dictionary system allows for the establishment of an inventory of all such data and its associated usage. It enables an assessment of the current state of the data and the existing degree of redundancy.

The net effect of such an effort not only generally results in the reduction of costs associated with the management of the data, but more importantly provides a significant improvement in the quality of the data. It is then that the true benefits of better decision-making can be realized.

The preceding uses of a data dictionary system are facets of the management of the data resource of the corporation, an activity called data administration. The basic rationale for this activity is the recognition that data represents an important and valuable asset of the enterprise and that it should be managed and controlled as carefully as other resources and assets are handled.

The domain of data so treated is not restricted to data that exists in a machine-processable form: the full concept of data administration is concerned with the entirety of the data regardless of the medium on which it resides. This task is similar, though more extensive, than what the Ansi/Sparc report calls building the conceptual schema of the enterprise. It is more general since it also includes identifying all the processes that interact with the entities in the conceptual schema.

Clearly Complex

The complexity of this task is clearly substantial and a data dictionary system can be used as the basic tool with which the conceptual schema can be stored and manipulated. Clearly, care must be given to the choice of the proper data model and the manner in which this model will be handled by the dictionary.

Today a number of data dictionary products are available commercially. Most of these are described in depth and analyzed in the previously mentioned book. In some respects the differences between the various products can be substantial.

The decision to use a data dictionary system, as well as the selection of the particular system to be used, should be made carefully. A proper assessment of the benefits to be realized as well as the costs that will have to be incurred should be made.

The cost of acquisition of the data dictionary system itself is usually a small part of the total cost. Provisions for the entry of data to the dictionary, the on going maintenance of this data and the development of procedures re-

(Continued on Page 34)

A NEW LOOK FOR

MI^2 CORPORATION

A major supplier of modems, acoustic couplers and interactive terminals to the Data Communications Industry.

New delivery schedules have become possible by expanding production capabilities.

New service with sixty new service locations throughout the country, response time has been reduced to a minimum.

New investment with the acquisition of MI^2 by Alanthus Corporation, a leading supplier of computer systems, peripherals, and data communications equipment, a sound financial base has been established.

New production manufacturing space at our Ohio plant has been doubled and production efficiency has been vastly increased.

New products are under development to bring greater versatility and economy to our product line

Call or write us:

A NEW MI^2 CORPORATION
1212 Kinnear Road
Columbus, Ohio 43212
614-481-8131

SPEEDY
AUTOMATIC REBLOCKING

SPEEDY automatically reblocks both tape and disk files during normal DOS/VS processing.
The end result is typically a 20-40% improvement in processing time and a 50-75% reduction in CPU overhead.
Reblocking reduces the number of input/output operations and cuts down on supervisor overhead time. It also reduces disk arm movement which can be the most serious bottleneck in DOS/VS multiprogramming.

■ 30 DAY FREE TRIAL ■

DATACHRON CORPORATION
174 Fifth Ave., New York, N.Y. 10010
[212] 675-5333

Starts With Trailer Control

Trucker Rides DBMS Road to Increase Profit

Special to CW

JACKSONVILLE, Fla. — The phrase "keep on trucking" could never apply to anyone more than it does to both Ryder truck lines and Transportation Teleprocessing Systems, Inc. (Trans-Tel). Ryder had revenues of $59.76 million in 1966 and more than $262 million in 1976. That's an increase of 340%!

One answer to this phenomenal growth is the dedication of the employees at both firms to the concept that they are part of one of the finest overall transportation systems in the country. Trans-Tel was formerly Ryder Truck Lines' DP department.

Prior to December 1971, Ryder was using a teletypewriter message switching network. Then the company installed message switching on its IBM 360/40, handled by a modified version of Qtam. The terminal system at that time reached about 80 locations.

Trailer control, the first application, was added to the system in May 1972. This provided up-to-the-minute information on all trailers involved in the intercity movement of shipments.

Evolution Begins

In June 1972 Brian Doran was hired to manage the computer operations and communications network. Under his guidance and management the evolutionary process began.

The control of tractors and over-the-road drivers involved in the intercity movement of shipments was added. This now provided the company with complete information concerning three factors that have a direct impact on customer services.

To meet the demands of the growth being experienced by Ryder, Trans-Tel was formed as a separate company in early 1973 and continued handling the corporation's DP and communications needs.

In May 1973, the second IBM 360/40 was added to insure system backup and 24-hour uptime. The next year was spent fine-tuning and expanding existing systems.

In May 1974, the on-line payroll system was added. It now produces more than 1,400 checks each week for drivers and does not require any paperwork to be sent to the office. In a period of 2-1/2 years the communications network had expanded to 150 communication terminals.

Meanwhile, Doran had begun looking for a data communications monitor to replace the home-grown Qtam-based system. Using a Datapro Research Corp. publication as a guide to potential suppliers, he decided in the fall of 1975 to acquire Total, the data base management system, and Environ/1, the communications monitor from Cincom Systems, Inc.

By the end of June 1976, Trans-Tel had rewritten and tested all of the trailer control, tractor control, driver control and on-line payroll programs and developed an up-to-date message switching system. This was done by a staff of five people, who also had to convert batch programs to function in a data base environment.

Growth presents problems as well as opportunities. TransTel now had about 180 active terminals on its network. The congestion resulted in an extremely serious deterioration of service to the users. This could not be tolerated even though a solution had not yet been determined.

Response time at the terminals varied from 15 seconds to 2-1/2 hours. Placing hardware monitors on its 360/40, Trans-Tel found it was using 97% of its CPU resources. In June 1976, one of the 360/40s was replaced by a 360/65 with 15 to 20 terminals on each of 14 circuits transmitting data 1,200 bit/sec. Response time dropped to a level consistently below 10 seconds.

On July 3, 1976, Trans-Tel shut down the old Qtam system and brought up the new Environ/1 and Total systems three hours later.

True Benefit Seen

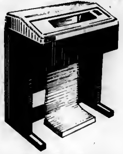
"It was around October of 1976 that we realized the true benefit of data base/data communications (DB/DC)," Doran said. "A user came to us with a request for a new inquiry transaction. We were able to respond and have it operational within 24 hours," he said.

When asked to what he attributed the success of Trans-Tel's on-line network, Doran said "the success of any system depends on the amount of

(Continued on Page 34)

The Printer Store
Digital Associates Corporation

PDP-11 users
save 40%
on LP11-YA printer costs.



With our DAC 2260, a 600 LPM plug-to-plug replecement for your LP11-YA. it comes with PDP-11 interface, installation and complate maintanance service. Buy, leesa or rant, you save 40%.

Specifications:
Solid font drum printar
600 LPM, 136 coiumn/line
64 character/column

Savings for
Data General,
Nova & Eclipse users.

Our diract replscements for Dats Generai printers will save you batwean 20% and 50% on your printar costs. Similar savings enabla you to replsca Nova end Eclipse printers with a higher speed or different printer entirely, and still ssve.

DAC-2230, replacement for Nova 4034G and Eclipse 4218.

Specifications:
Soiid font drum printar
300 LPM, 136 coiumn/line
64 character/coiumn

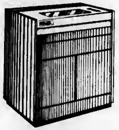
20% to 50% Savings on Printer Prices.

We'll even buy your Thanksgiving Turkey!

Digital Associetas' Printar Store has a hoiiday special you won't want to miss. Complete printer systems (printer interface, installstion snd service). At prices mini-computer suppliers can't match. Becausa we buy printers in quantity directly from manufacturers and edd Interfaces to all the popular mini-computar CPU's.

Tha Printar Store can supply printers from 100 to 1500 LPM, dot matrix, drum, chain train or band technology, for DEC, Dats General, Hawiatt-Packard, Interdata, G.A. snd most other mini-computer systems. And for iBM Series 1 and S/3 computars. We instaii what we saii and sarvica whet we instaii (unless you insist on doing it yourself). Buy, lease or rent, you'ii sava 20% to 50% on prices you'd pay to the mini-computer manufacturer. We'll even buy your Thanksgiving turkey if you order your printer by November 24.

The Chain Train
Alternative



DAC CT-6644, 600 LPM printer that raplacas DEC's LP11-YA or Data Ganeral's 4215 models. Lattar quality printing at about 40% lass than DEC's 600 LPM drum printar, 30% lass than the Data Ganaral model.

Have you ordered an IBM Series 1?

Before you sign up for a 300 LPM printer, call Tha Printer Store. Wa'ii give you a piug-to-plug compatible 600 LPM chain-train printer for tha sama price.

Digital Associates Corporation
1039 E. Main Street , Dept. A
Stamford, Connecticut 06902

☐ I'd like more information on The Printer Store
☐ Send literature on following printer______

Neme______
Company______ Title______
Address______
City______ State____ Zip______
Phone______

Digital Associates Corp., 1039 E. Main St., Stamford, CT 06902 Toll Free 800-243-9054. In CT (203) 327-9210.

JASPER
JOB ACCOUNTING
& BILLING
FOR DOS, DOS/VS, OS

NEW FEATURES
- WIZARD REPORT GENERATOR
- CICS BILLING
- RJE ACCOUNTING

ICP Million Dollar Club

DATACHRON CORPORATION
174 Fifth Ave., New York, N.Y. 10010
[illegible]

The original name in magnetic media is the name to look for in information processing... BASF.

Back in 1932, BASF invented magnetic tape . . . the forerunner of all of today's magnetic media. Since then, we've had plenty of time to put together the best-performing, most comprehensive line of information processing media on the market.

Whatever you need in magnetic media, BASF makes it and makes it better. Ask our customers . . . most people who choose BASF make it their only choice. And, BASF quality costs no more than the competition. For details on BASF information processing media, write BASF Systems, Crosby Drive, Bedford, Mass. 01730, or call our nearest regional office: in Los Angeles, (213) 451-8781; in Chicago, (312) 343-6618; in Clifton, N.J. (201) 546-9111; in Montreal, (514) 341-5411; in Toronto, (416) 675-3611; in Dallas, (214) 233-6607.

BASF The Original.

Computer Tape Hard and Flexible Disks Cassettes Mag Cards

COMPUTERWORLD

. . .the one weekly newspaper that's designed to fulfill your unique "need to know". . . the one newspaper that can give you all the current information you need to benefit you, your organization and your career progress. . . 52 weeks of incisive news, commentary and special reports. . .subscribe today, use the attached postage paid order form.

☐ *Please enter my subscription*
(details on back)

☐ *I'm already a subscriber, but I'd like you to change my:*
- ☐ *address*
- ☐ *title*
- ☐ *industry*
- ☐ *other*

My current mailing label is attached and I've filled in new information on the other side

Put old label or label information here

RATES: United States – $18 Canada and PUAS – $28
Europe and Middle East – $50 All Other Foreign – $65

If charge we must have cardholder's signature:

Signature: ____________________

Expiration Date: ____________________

First Initial		**Middle Initial**		**Surname**	
Your Title					
Company Name					
Mail To:					
City		**State**		**Zip Code**	

Address shown is:
☐ Business
☐ Home

☐ Check here if you do not wish to receive promotional mail from *Computerworld.*

☐ Check here if you're interested in receiving information on *Computerworld's* Index.

PLEASE CIRCLE 1 NUMBER IN EACH CATEGORY

BUSINESS/INDUSTRY

10 Manufacturer of Computer or DP Hardware/Peripherals
20 Manufacturer (other)
30 DP Service Bureau/Software/Planning/Consulting
40 Public Utility/Communication Systems/Transportation
50 Wholesale/Retail Trade
60 Finance/Insurence/Real Estate
70 Mining/Construction/Petroleum/Refining
75 Business Service (except DP)
80 Education/Medicine/Law
85 Government - Federal/State/Local
90 Printing/Publishing/Other Communication Service
95 Other: ____________________

TITLE/OCCUPATION/FUNCTION

11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Finance Officer
21 Director/Manager of Operation/Planning/
Administrative Service
22 Director/Manager/Supervisor DP
23 Systeme Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
41 Application Engineer
42 Other Engineering
51 Mfg Sales Representative
52 Other Sales/Marketing
60 Consultant
70 Lawyer/Accountant
90 Librarian/Educator/Student
90 Other: ____________________

COMPUTERWORLD
[illegible] Washington Street, Newton, Mass 02160

Detach here, fold, and place in post-paid envelope attached through binding.

Mixed Billing Technique Controls DBMS Accounts At Corporate Data Center

Special to CW

FULLERTON, Calif. — When you're faced with the constant yo-yo program of terminals being installed and taken out, the ability to accurately account for your total data base management system's (DBMS) budgets becomes very difficult.

That was one of the prime problems facing the Data Base Services Group (DBSG) of Hughes Corporate Data Processing Center here when it began exploring new methods for billing its customers for work handled by IBM's information management system. Operating under ASP, the group has an MVT 21.8 system that uses IBM 370/165s to support 65 IMS terminals in Southern California and Arizona.

The IMS billing system they had been using was based on a fixed charge per terminal plus hardware costs.

Chuck Allen, supervisor of DBSG, explained that at the beginning of each year, all of the resource and people costs were put into a pool. They then estimated the number of terminals which would be in operation, divided the pool costs and used that figure as a basis for their fixed terminal charges.

"The problem was that business is never static," he commented. "It is in a constant state of fluctuation. Because of the way we had established our charges, people would have the terminal removed when they had a downturn to avoid the cost. Then, when things got better, they would have the terminal installed again. We had to have a way of smoothing out the peaks and valleys."

In addition, the group wanted to have a more complete picture of system characteristics and profiles.

Flexible Package

To develop the control and accounting information it needed for the IMS system, DBSG chose Boole & Babbage's Control/IMS product.

"We weren't certain whether we would use the resource or transaction billing techniques, and Control/IMS would provide us with the flexibility and information we needed to make the best possible decision," Allen said.

DBSG felt that resource billing would be the most desirable technical method because it would provide a better control mechanism on users to refine some of their more poorly designed systems, which were using excessive amounts of IMS resources. Allen noted that this approach would provide the user with a "profit" initiative and free up resources for new applications.

While resource billing may have been the most desirable method of charging back the system, it was totally unacceptable from the user's standpoint. "First of all, budgeting by resource item by non-data processing personnel is too difficult," Allen explained. "To do it properly, they would have had to learn our language and right away you know you have a giant roadblock. Secondly, they couldn't budget for the year with any confidence since they didn't have the history file they would need to base costs on."

With the approach thought most desirable from DP's point of view, DBSG moved to transaction billing.

Initially, they set up three types of transactions — updates, inquiries, and data collection. They then spent three months computing various ways of charging for these transactions so that they would recover their costs.

"To accomplish this," Allen said, "we used all of the performance reporting tools available with Control/IBM."

They studied reports on who the users were, what levels of service were being provided and what and how much work they were doing. They also studied the high activity data bases that performed efficiently and how each data base was being used. They also studied transaction, program and region reports to develop a comprehensive and accurate picture of their system's characteristics and profiles.

"We suddenly found that by categorizing the types of transactions we had originally planned, we would be penalizing some systems more than others," Allen recounted. He explained that straight transaction billing penalizes heavy volume transactions that use few resources. However, update transactions that are clumsily written and poorly designed don't bear their proportionate costs.

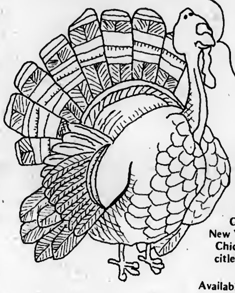
Because of this, the group developed a system which was more equitable. "We now have a system which has three types of transactions, all charged at different rates," Allen stated.

As a result of the improved billing technique, Allen's group has found there is a greater utilization of the IMS system. No one is asking to have his terminal removed when business is down and there is an increasing number of requests for more terminals.

"Management is very delighted with the fact that we can now accurately account for our operation," Allen said. "But we like it because now we can control our IMS situation. In addition, we're getting better action with our users as far as budgeting and new applications are concerned." He explained that users are constantly reassessing their budgets and are requesting trend and forecast information.

"We've had a number of other monitoring tools we have used in the past," Allen commented, "but Control/IMS provides us with all the information we need regarding what's going on in the system and it puts all of the data in one place rather than in a volume of reports here and there. We've been able to totally eliminate the use of DC monitors, tune new programs and applications and even troubleshoot when things go wrong. To develop the necessary performance reporting information, they operate Control/IMS on both their test and production systems.

According to Allen, though, the best benefits are a result of the need. He noted that since management was holding his group accountable for the way they were "running their business," they can now control and account for the business in a professional manner.


If I knew how to use CICS, I wouldn't be such a turkey!

ON-LINE SOFTWARE INTERNATIONAL offers comprehensive and unique CICS educational training programs.

Courses are offered in New York, San Francisco, Chicago and other major cities across the country.

Available in both public and in-house environments.

TO RECEIVE COURSE DESCRIPTIONS AND SCHEDULING:

Call Toll Free 800-631-8374 *or in New Jersey* (201) 423-3200

ON-LINE SOFTWARE INTERNATIONAL

SOFTWARE PLAZA ROUTE 208 HAWTHORNE, N.J. 07506

Look Into Johnson Systems'

CICS/VS
UTILIZATION MONITOR AND CHARGEBACK SYSTEM

"Now, a powerful data collection system that lets you accurately account for . . . and equitably bill for . . . all resources used by each user."

"The first feasible alternative to Performance Analyzer."

Send me your brochure about the new CICS/VS UTILIZATION MONITOR and CHARGEBACK SYSTEM.

Name ____________________

Title ____________________

Company ____________________

Address ____________________

City ____________ State ____________

Zip ____________ Phone (______) ____________

Computer ____________ Operating System ____________

C1114

Johnson Systems, Inc.
8400 Westpark Drive
McLean, Virginia 22101
(703) 893-8700

Trucker Takes DBMS Route and Boosts Profits

(Continued from Page 31)

planning and experience that you have to put into it. We spent four full days with a Cincom Systems' engineer doing nothing but data base design on the front end of this system. The data communications aspect was the easiest for us. We knew what we wanted and we had four years of data communications experience. As long as Environ/1 and Total did what we were told they would do, we didn't anticipate any major problems," he said.

Never a Problem

"Since installing Total, we have never had a single problem with the software and there are not many products you can say that about today. Environ/1, on the other hand, did cause us some problems initially. Proper consideration had not been given to the tremendous volume of administrative messages we would transmit daily," he explained.

"We also had some annoying problems in our method of queuing incoming messages," Doran noted. "We were handling too much data for our original Total queuing technique. After discussing several possible solutions with Cincom, steps were taken to implement a byte string queuing technique which proved to be much faster," he said.

Trans-Tel now averages a message every two seconds, 24 hours a day, seven days a week, including all time for shutdowns, implementing new applications, backups and CPU downtime. "As you can see, we just had too much volume for our original queuing method," Doran said.

During the third quarter of 1976, Trans-Tel added several inquiry applications while maintaining the existing system. In the fourth quarter work began on sales applications to assist 167 salesmen and 160 terminal managers. This system was installed in January.

Another application implemented this year is the preventive maintenance inspections of all city equipment.

Currently, Trans-Tel is running two 512K IBM 360/65s under basic Edos with Memorex 3670 disk devices. Environ/1 is currently in a 348K partition, including a data base module size of 50K utilizing 20K for Btam.

There are 206 communication terminals on the network utilizing 14 lines at 1,200 bit/sec. Consideration is presently being given to expanding the network to 27 data circuits to further improve response time.

Data Dictionary Key to Control

(Continued from Page 30)

quired for the integrity of the system can be quite expensive.

Of all the projects undertaken by an organization the data dictionary is perhaps one of the most critical. Central to the success of a dictionary project is the degree of commitment that exists at all levels of the organization, including the highest levels of management. Proper understanding of the costs and benefits involved is a key element of this issue, this being true regardless of the environment in which the dictionary will be used.

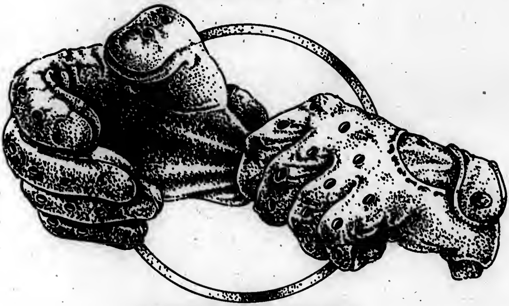
Responsibilities

Similarly, the administration of the dictionary itself must be reflected in the organizational structure of the enterprise and a clear assignment of the responsibilities associated with the integrity of the contents and use of the dictionary must be made.

The importance of data dictionary systems will continue to increase in the future. It can be expected that many parts of the total computing system will avail themselves of the facilities contained in a data dictionary system and some of its logical extensions, such as distributed processing and/or data bases. Additional momentum will be provided by privacy legislation, as the data dictionary system is a viable tool for the documentation of the usage of data and showing compliance with such legislation.

Lefkovits is the president of Henry C. Lefkovits & Associates, Inc. of Harvard, Mass., a consulting firm.

Data Base/Data Communication



The Perfect Fit from Cincom Systems

"Data base and data communication software must go 'hand in glove' to realize their maximum contribution to an organization's information system plan."

This statement is heard over and over again from the *successful implementors of complex, on-line systems*. It certainly is logical! Yet... we still see the occasional disappointed user who has violated this principle and attempted to get by with the old interface approach.

Cincom's performance-oriented solution to this DB/DC requirement is to "perfectly fit" the strong "hand" of the *TOTAL Data Base Management System*... serving nearly 2000 customers worldwide ...with its fully integrated "glove," *the Environ/1 Data Communication System*. The on-line results of such meticulous tailoring include:

Optimum Performance and Efficiency
- Self-optimizing core management.
- Fully re-entrant COBOL-XT application code.
- Conversational programming.
- Multi-threaded operation.

Maximum Flexibility
- Operating system independence.
- Terminal device independence.

Comprehensive Integrity and Security
- Automatic logging, backup and recovery capability.
- Concurrent update protection.
- Dynamic task sign-on and dispatching.

Ease of Use
- Batch to on-line programmers in hours.
- Off-line program testing and simulation.
- Debugging aids and statistical analysis.
- On-line data collection and editing options.
- On-line application program maintenance option.

These state of the art capabilities, coupled with Cincom's international support organization, have made TOTAL and ENVIRON/1 the modern DB/DC choice for many of the world's most progressive companies.

If you are evaluating data base, with immediate or future data communications requirements, Cincom would like the opportunity to show you the perfect DB/DC fit for your organization. We have 34 offices in major U.S. cities and worldwide.

Cincom Systems, Inc : We create efficiency.
2300 Montana Avenue, Cincinnati, Ohio 45211 513/662-2300

KEY
CON-
TROL

LIB/OL uses quick function keys. SPM needs cumbersome transaction codes.

SWITCH
NOW!

SEE PAGE 3.

"IDMS is #1 in training"*

*say users in Datapro study... and dozens of customer letters

In the fourth annual Datapro Research survey of software users, Cullinane's IDMS was rated #1 among all Database Management Systems. #1 in overall satisfaction. #1 in Ease of Use. #1 in Ease of Installation. #1 in Vendor Support. #1 in Documentation. #1 in Training.

How did we get to be #1 in Training? Here's what some of our customers say:

"...the IDMS database course presented by Mr. Dave Ireland was probably the most comprehensive and valuable course our group has received in quite some time."

"Cullinane has the most competent, professional staff we have ever had the pleasure to work with." "...your training received nothing but positive comments."

"The professionalism displayed ranged all the way from knowing the name of each member in the class to the use of sophisticated teaching methods through which difficult-to-understand concepts were repeated in various ways to firmly establish them in each person's mind."

"The splendid class... has allowed an increased level of effectiveness in the use of (IDMS)." "You did an outstanding job and received rave reviews."

If you'd like to learn more about the Cullinane Training Program, and IDMS in general, just complete the attached coupon, or give us a call.

Think twice. You'll choose the database system users rate #1.

1976 datapro HONOR ROLL

Name/title ____________________
____
Organization/department ____________________
____
City __________ State __________ Zip __________
Tel. ____________________
My computer is ____________________

Cullinane Corporation

Wellesley Office Park, 20 William St., Wellesley, Mass. 02181 (617) 237-6600

PRONTO. The biggest booster

Nice system, your 3270's and 370.

But PRONTO, the Sperry Univac distributed data processing system, boosts its cost efficiency by taking care of all your remote computer needs. And freeing your 370 host to do the work it does best.

PRONTO is a software package that runs on a V77 minicomputer, equipped with peripherals such as line printers, video terminals, and disks.

PRONTO boosts the computer power at your remote branches by migrating computer services to meet their individual needs. Without changing host hardware and software.

When you add PRONTO to your current 3270 network, you suddenly find yourself able to concurrently perform local tasks you never could before.

Local and remote on-line processing. Local and remote batch processing. You can create new remote data bases. Not just for

your 3270 network ever had.

simplistic tasks, but for complex data base management services.

PRONTO speaks your mainframe's language. Whether it be COBOL or FORTRAN. And the system can even accommodate RPG-II.

1000 host computers already use TOTAL,® our data base management system.

With PRONTO, you won't use as much costly mainframe time or as many dedicated communications lines.

You get all this. Plus all the service and support of Sperry Univac around the world.

And it's those things that will turn a lot of 3270/370 users into Sperry Univac boosters.

Write to us at Sperry Univac Mini-Computer Operations, 2722 Michelson Drive, Irvine, California 92713. Or call (714) 833-2400.

SPERRY UNIVAC

SPERRY UNIVAC IS A DIVISION OF SPERRY RAND CORPORATION

Finally... a word processing system that does things your way

Our new word processing system—ForeWord™—gives you the flexibility you need to fit today's advanced technology to your work environment...at a price your business can afford.

More than an automated typewriter

ForeWord is a shared logic system that uses a Four-Phase computer with up to 16 video display stations and 16 printers to help your staff prepare letter-perfect correspondence in a fraction of the time once required. Either in a central location. Or in individual offices. Or both with the same system.

Ideal for manuals and proposals

ForeWord can also be used for direct composition, editing, and final typing of the large documents that once tied up your staff for days. Paragraphs can be retrieved from local storage and updated, chapters reorganized...all at computer speed. And all while other operators are performing their independent tasks.

Nationwide support

ForeWord uses the same proven hardware as our distributed processing systems, and is backed by the same network of experienced service personnel in strategic locations throughout the country.

For more information, call your local Four-Phase office. Or write us at the address below.

Four-Phase Systems

10700 North DeAnza Blvd., Cupertino, CA 95014

TM—Trademark of Four-Phase Systems, Inc.

'Latest Features' Don't Matter

Performance Seen Key to Terminal Use

By Ronald A. Frank
CW Staff

LOS ANGELES — Users should not be concerned if their communications terminals do not incorporate the latest state-of-the-art features. If the devices do the job for which they were intended, then they were worth the cost, according to Dennis J. Cagan, president of The David Jamison Carlyle Corp., a terminal supplier.

In advising users on how to select CRTs and teleprinters, Cagan told attendees at a recent Interface West session here that once a required set of features is defined, the next area of concern should be equipment reliability.

When it comes to reliability, Cagan said, most terminals have about the same performance levels. A CRT can be expected to fail about two times per year; a teleprinter will fail about three to four times per year on the average, he noted.

One of the best ways to evaluate potentially suitable devices is to ask vendor salesmen their opinions on competitive equipment. Although some users view this approach as being questionable, there is nothing wrong with the user taking advantage of any information which he can gather before making a decision, Cagan said.

CW at Interface

Another way of getting information on equipment under consideration is to contact existing customers. Whenever possible, the user should first try to find nonsatisfied users of the terminals, he suggested.

Competing sales representatives often have information about unhappy users since these are the type of prospects to which they are interested in selling, Cagan said.

After any negative information has been collected about a particular terminal, it should then be discussed with satisfied users to see whether it is accurate or just relates to an isolated case.

Existing CRT and teleprinter users should be asked specific questions on how the vendor reacted in maintenance and other support situations. It is also important to find out whether the vendor complied with promised delivery schedules or whether the terminals were installed late, Cagan stressed.

An existing user should be questioned on the level of service provided when malfunctions occur. The user's real opinion of a vendor will probably come out when he is asked whether he would buy the same terminals again or whether he plans to add more in the future, Cagan told the attendees.

Terminal users should carefully evaluate the need for vendor maintenance, he added. Many of the currently available terminals can be maintained by most staff members who can use a screwdriver, he explained.

Most one-year maintenance policies cost at least $12.50/mo per terminal and it may be less costly to stock spare components like circuit boards and replace them in-house. If a staff member can repair a teletypewriter, there should be no problem with maintaining the current CRTs and teleprinters, he said.

In the area of pricing, local distributors often provide terminals at lower costs than the vendor. In addition, the user should be aware of available discounts; it may be less cost per unit to get a larger number of terminals if this puts the user into the next higher discount bracket, Cagan said.

PTTs Hold Nine-Tier Job

LOS ANGELES — Although it is widely known that the Postal, Telephone and Telegraph (PTT) authorities in various foreign countries are responsible for administering communications services, the exact areas covered by the PTTs are not often defined, according to Leonard Elfenbein.

Speaking at an Interface West session here recently on international carriers and services, the consultant said the PTTs are responsible for nine major types of services in most countries.

Time-sharing and data base applications are covered by the PTTs, as well as joint use and line-sharing regulations. Transmission of data across national borders and the administration of data on switched public networks are also PTT responsibilities.

Telex dial-in and dial-out services and data terminating regulations fall under the domain of the PTTs, as well as the administration of interconnection, which includes authority for type approval of accepted equipment.

The PTT's responsibilities also include the encryption of data and cover Telex, public switched networks and private line facilities. In addition, the PTTs set tariff surcharges and discounts depending on local regulations.

Discounts are often offered if a user selects a country as a hubbing point in an international net. In rare cases, surcharges can be levied, for example when a user does not transmit data at the rated speed of a line, Elfenbein said.

Software Provides Telenet Link For Burroughs, Univac Systems

WASHINGTON, D.C. — Telenet Communications Corp. has developed software packet network interfaces for Burroughs B6700 and B7700 systems and Univac 1100 series systems.

Both interface packages will be provided by Telenet under a licensing arrangement and are expected to be available for customer installation next month, according to a spokesman. A similar network interface for IBM 360/370 systems has been offered by Telenet for some time.

The software interfaces are said to offer two advantages to network users, faster response time and lower cost. They permit the user to handle a large number of simultaneous virtual connections over a single full-duplex access channel connecting the computer to the Telenet network, the spokesman said.

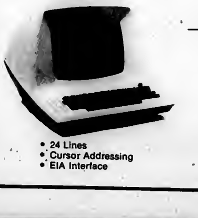
In addition, the software features full error control between the host computer and network and statistical multiplexing which minimizes bandwidth requirements, Telenet said.

The Burroughs interface supports asynchronous terminals and communicates with the network using the CCITT X.25 packet protocol. The package was designed to operate on any B6700 or B7700 with a Burroughs data communications processor.

The Univac interface operates as a user program at the real-time level and uses the Telenet Host Interface Protocol to handle asynchronous terminals.

The Univac interface can be used on 1100 series systems which have at least 192K words of memory and a high-speed synchronous communications terminal module.

Both interface packages will be offered by Telenet for a one-time installation and licensing fee of $1,000 and a recurring fee of $325/mo covering maintenance and program updates. Telenet is at 1050 17th St. N.W., Washington, D.C. 20036.



$4995
month
5 or more-one order
one location
($55.00/mo. single unit)

- 1 Year Lease
- Complete Maint. Included
- No Automatic Renewals
- No Tricks - No Gimmicks - No Joke

Give us a Call!!!!

ADM-3A

- 24 Lines
- Cursor Addressing
- EIA Interface

Call
NATIONAL COMPUTER
The Greatest Name in Terminals
800-243-9006 Toll Free
In Conn. 203-325-3831
In Boston 617-235-7055
26 Sixth St. Stamford, CT 06905

OTHER PRODUCTS
DEC LA-36 • LS-36 ASR • TI-745-743-733
Anderson Jacobson Couplers and Modems
Lease • Rent • Purchase Plans Available

Vadic Modem For Dial Lines

SUNNYVALE, Calif. — An originate-only full-duplex 1,200 bit/sec modem for use on dial-up lines is available from Vadic Corp.

Designated VA3416, the modem costs $720 including VA1601V chassis and power supply.

The VA3416 is crystal-controlled and can transmit and receive at 1,225 bit/sec permitting it to operate with multiplexers. With Vadic's data access arrangement, registered with the Federal Communications VA3416 directly connects to any dial-up telephone, the company said.

Vadic is at 222 Caspian Drive, Sunnyvale, Calif. 94086.

Computek Adds Text Processing System

BURLINGTON, Mass. — Computek, Inc. has enhanced its Series 200 intelligent terminal system with a communications-oriented text processor.

Called Econotext, the system combines the Series 200 processor with up to four 2,000-character CRTs, 1.5M bytes of mass storage, optional hardcopy printers and software for text input, file management and applications programs.

Econotext software includes three operating modules: The editing module controls editing and movement of text on the CRT screens; the file management module lets the operator store, retrieve and manipulate text on diskettes and access print routines; and the communications module allows the system to transmit text one-way to remote sites.

The system is designed for use by newspapers as a reporter station, remote bureau terminal or in newsrooms, the company said.

Econotext can transmit data at speeds up to 9,600 bit/sec and it is compatible with United Press International and Associated Press high-speed wire service protocol, Computek said. Since communications is under program control, other protocols can be implemented.

Exceptional Clarity Claimed

The system CRTs display the 128-character Ascii upper and lower case set plus control symbols using a 20 by 14 dot matrix, which the firm claims has "exceptional clarity." Each terminal can access text in its own memory buffer of 5,400 characters and the contents of the buffer can be altered by writing or reading from local diskette storage.

A typical stand-alone system with dual drive floppy disk, 5,600-character buffer and communications costs $11,250. A "quad" system including four CRTs, floppy disk, buffers and communications costs $22,500 or $5,625 per terminal.

Computek, a subsidiary of General Automation, is at 63 Second Ave., Burlington, Mass. 01803.

M&R Enterprises Has Modem in Kit Form

SUNNYVALE, Calif. — The Pennywhistle 103 acoustic coupler, a modem in kit form, was introduced by M&R Enterprises.

The unit can record data from a terminal or a computer on audio tape for playback and can also be used for telephone "hamming" or communications with the deaf, according to a spokesman for the firm. Data recordings can be made without critical speed requirements and the device will operate in the half-duplex or full-duplex mode, he said.

The kit, which includes a three-stage filter and complete documentation, costs $129.95 from M&R Enterprises, P.O. Box 61011, Sunnyvale, Calif. 94088.

Teleprocessing, Nets Subjects of Course

NEW YORK — A course on teleprocessing (TP) systems and network design will be offered by American Management Associations here on Nov. 28-Dec. 1.

The course, meeting at association headquarters, will cost $540 for association members and $620 for nonmembers. Team discounts are available for groups of three or more at $460 for association members and $525 for nonmembers from American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Guess who gets to do Replacement Cost Measurement this year?

Probably you!

Last year was the first time the SEC required major corporations to undertake replacement cost measurement. Complying with Accounting Series Release 190 (ASR-190) was a struggle. For the most part, the job was done manually by staff. It took loads of time, cost plenty of money and so companies are now looking for an easier way to do it.

This year many corporations are assigning this responsibility to data processing departments. Now you're wondering whether internal or external systems development is the answer. Relax, we've got an alternative.

Meet VSCOM-190

VSCOM-190 is a system designed by Valuation Systems Corporation and available on COMSHARE's international timesharing network. It enables your company to effectively comply with ASR-190. VSCOM-190 provides:

1. Solid experience in replacement cost/current value measurement. Many major corporations got accurate information from VSCOM-190 last year.
2. Up-to-date and comprehensive domestic data that is immediately usable without refinements.
3. The most extensive foreign index data available anywhere.
4. A special module which makes it easy for you to gather your company's basic data.
5. A system that has been updated to reflect the latest SEC requirements.
6. Low, low cost with charges based only on usage. In fact, experience has shown that these costs are much lower than if you did it manually.

There's much more you should know about VSCOM-190. For more information, send in the coupon below, or call Bob Held at (313) 994-4800.

(Mail to:)
Robert J. Held -
Financial Services Product Manager
Wolverine Tower
COMSHARE, INCORPORATED
P.O. Box 1588
Ann Arbor, Michigan 48106

Please send me more information about VSCOM/190.

Please have a COMSHARE representative contact me.

Name
Title
Company
City State Zip

Atlanta
Boston
Chicago
Cincinnati
Cleveland
Dallas
Detroit
Houston
Los Angeles Downtown

Los Angeles Airport
Minneapolis
New York
Philadelphia
Pittsburgh
San Francisco
St Louis
Washington D C

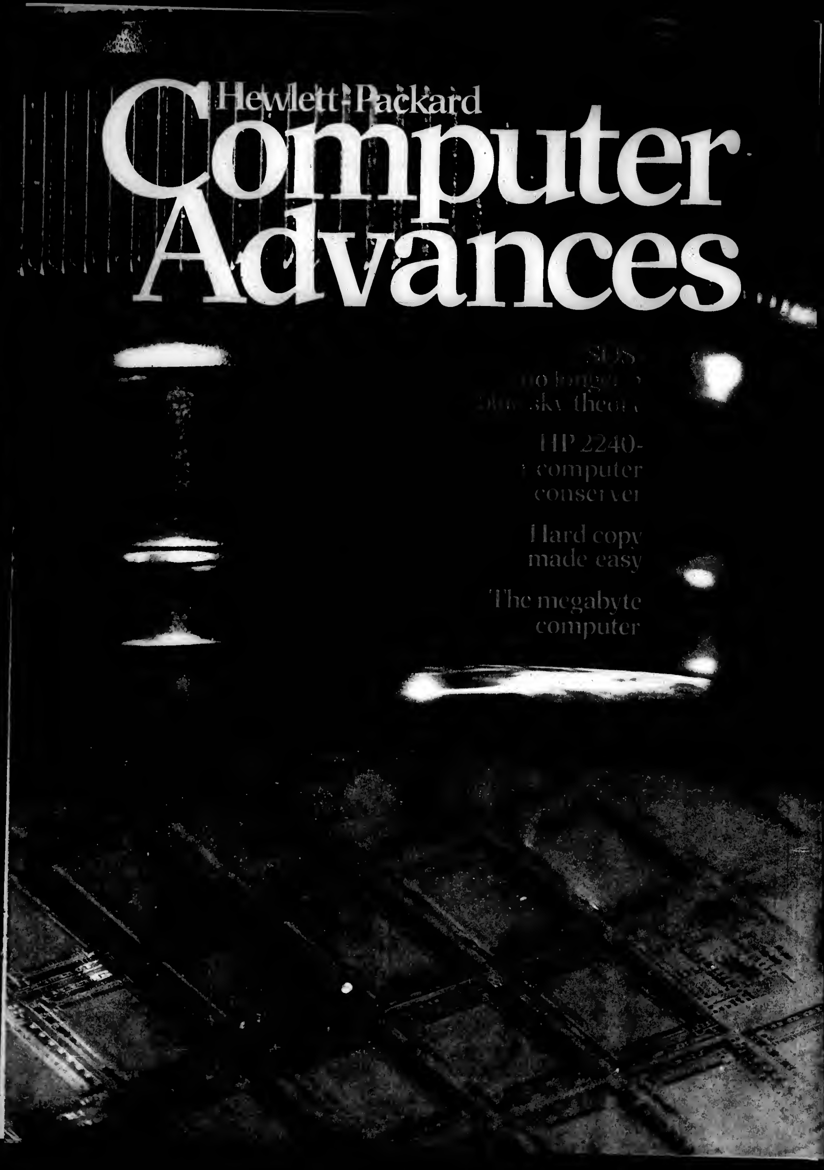
COMSHARE®
MAKING THE COMPUTER MAKE SENSE.

FAST EDIT

Full screen edit with LIB/OL.
Line-at-a-time with SPM.

SWITCH NOW!

SEE PAGE 3.



Hewlett-Packard

Computer Advances

SOS
no longer a
blue-sky theory

HP 2240-
a computer
conserver

Hard copy
made easy

The megabyte
computer

SOS - a blue sky theory comes down to earth

Five years ago, Hewlett-Packard established its silicon-on-sapphire technology laboratory in Cupertino, California. This investment was prompted by a recognition of the customer benefits to be gained in our products from a CMOS/SOS (complementary Metal-Oxide Semiconductor, Silicon-On-Sapphire) process.

With sapphire, a non-conductive material, we can achieve superior dielectric isolation which enables high speeds and close packing of circuits. We are also able to eliminate parasitic capacitance.

◀ *Cover*
There is an average of 200 dies on one of our three inch SOS wafers. The process of separating them into individual chips is similar to that of glass cutting, but as sapphire and diamonds are nearly neighbors on Mohs Hardness Scale, it is not possible to score the wafers with any diamond cutter. Only a laser scriber, whose power reaches far into the deep infra-red, can melt and evaporate the sapphire in preparation for mechanically breaking the chips apart.

For example, our Phi chip, with an area of 28mm², contains 8,000 transistors. Phi serves as a single chip interface between any microprocessor bus and the HP-IB,* and runs at speeds up to one megahertz while typically consuming only 300 milliwatts. Low power consumption is another SOS charactertistic.

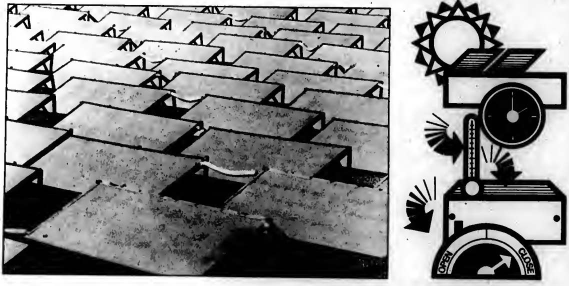
Much of our effort during these years has been in establishing reliability and producibility. HP has recently introduced three new products that use several types of CMOS/SOS chips...

With SOS, the HP 2240 is a computer conserver

The HP 2240 processor is HP's first measurement and control subsystem based on SOS technology. It simplifies product testing and real-time data acquisition, monitoring, and control; and can be used with 21MX-based systems, HP 1000 computer systems, or HP 9800 series desktop computers. The HP 2240 can also operate remotely with the HP 3070 data collection terminal or over telephone lines with HP's common carrier interface.

Built-in intelligence

Microprocessor-based intelligence makes testing easier and less expen-



One-line program
WU,600,000 AI,3,2,10, A0,4,3,1,50!

Time WU, 600,000
Wait until the 2240A elapsed time clock reaches 600 seconds, 0 milliseconds, which is ten minutes.

Measure AI,3,2,10
Input 10 sequential analog readings from the temperature sensor on channels 2 through 11 of card 3.

Control A0,4,3,1,50!
Output 1 analog voltage to to the hot air damper to close it 50%.

Solar heating is just one application that can be automated with HP's new measurement/control processor. For example the HP 2240 can measure room temperature at specified intervals—every ten minutes, for example—and control that temperature by regulating heat transfer from the system's solar panels. This is accomplished by three simple statements from the HP 2240's extensive set of high level commands. A similar solar panel-to-hot water heat transfer system was initiated by employees at HP's Sunnyvale, California site and has been running successfully for the past four years.

sive than with previous systems. With HP's Micro-CPU Chip as its heart, this processor executes critical real-time tasks that previously had to be handled by the computer. This frees the computer to do more appropriate tasks.

High speed, low power

SOS technology allows the HP 2240 to gather, store, and correct measurements at a fast 20,000-per-second rate. Yet this impressive performance is possible with a minimal amount of power — the HP 2240 draws no more current than a 150 watt lightbulb.

Easy as one, two, three

Microprocessor control couples with the Hewlett-Packard Interface Bus (HP-IB*) capability and can make an HP 2240 system operational within hours, in three easy steps.

First, you interface the HP 2240 to the computer via a single HP-IB cable; second, connect the HP 2240 to your sensors or controls via one of a large assortment of measurement/control cards; and third, instruct the HP 2240 to perform the real-time task with the aid of a simple, one-line program.

Two in one

The HP 2240 has the ability to measure and control both analog and digital signals, thus lowering automation costs in manufacturing and

Continued on page 5

***HP's implementation of IEEE Standard 488-1975 "Digital Interface for Programmable Instrumentation," and identical ANSI Standard MC 1.1.**

Hard copy made easy with SOS-the HP 2631/2635

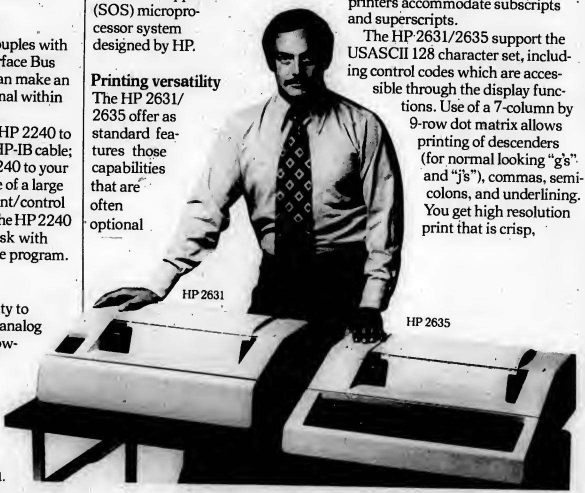
The new line of HP 2630 serial printers has just been announced. The HP 2631 is designed for environments requiring a low-cost, high performance printer. The HP 2635, the same high throughput printer with a keyboard, is suited to interactive environments. These printers operate at 180 characters per second (cps.)

Both printers are controlled by a silicon-on-sapphire (SOS) microprocessor system designed by HP.

Printing versatility

The HP 2631/2635 offer as standard features those capabilities that are often optional on other printers. For example, there are three print modes — normal (10 characters per inch), expanded (5 characters per inch) for titles and headings, and compressed (16.7 characters per inch). Compressed mode, an economical paper saver, allows you to generate reports in 8½ by 11 inch format with 132 characters per line, and to pack 227 characters per line on standard-sized computer paper. These three print modes can be intermixed on a single line. Lines can be spaced at vertical pitches of 1, 2, 3, 4, 6, 8, or 12 lines per inch, so the printers accommodate subscripts and superscripts.

The HP 2631/2635 support the USASCII 128 character set, including control codes which are accessible through the display functions. Use of a 7-column by 9-row dot matrix allows printing of descenders (for normal looking "g's" and "j's"), commas, semicolons, and underlining. You get high resolution print that is crisp,

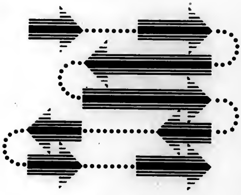


clear, and readable—even on the sixth sheet of a multiple-part form.

The HP 2631 is bilingual, supporting two full character sets (one standard, one optional), and can intermix the two on any one line. Alternate sets so far include Swedish/Finnish, Spanish, French, German, Norwegian/Danish, and British.

High throughput

Consider the path taken by the print head. It is bi-directional, fast, and determined by a "smart printing" algorithm that selects the optimal path and speed. By the time one line is printed, the next several lines have been processed and stored in a buffer. Leading and trailing spaces have been detected and ignored—the head moves directly to the first character of the next line to be printed. When ten or more adjacent spaces have been detected within a line, the head speeds to the next printable character at an accelerated rate of 450 cps, a major time-saver when printing tabular data.



The HP 2631/2635 choose the most efficient direction (left-to-right or right-to-left) for the print head to move. Smart, bi-directional printing can increase throughput as much as 50%.

A sixty yard, inky, mobius strip has been packed into this cartridge for quick, convenient, and clean insertion into the HP 2631/2635 printers.

Design and mechanical simplicity

The HP 2631/2635 are simple and modular in design, removing some of the hassle and cost often associated with printer ownership. The number of mechanical parts has been reduced to lessen the probability of breaking down and wearing out. One servo-motor, for example, drives both the print head and ribbon cartridge. To improve serviceability, boards plug in and pull out quickly. Loosen only six screws to ready the printer for repair.

Trouble-free ownership

Both printers are adjustment free. The chassis is factory-adjusted and "sealed" for life. The nine-wire, ballistic, print head is a simple, dynamic system which self-aligns and can be easily replaced.

The printers are clean—you'll never touch an oil can again since key moving surfaces are a teflon-based material. When changing the ribbon cartridge, you'll never touch the inky fabric.

The inexpensive, trouble-free cartridge ribbon also shows the designers' concern for mechanical reliability. The cartridge employs a mobius loop, which allows full surface use of the ribbon and ensures that printing is always on a fresh part of the ribbon. The ribbon normally needs changing only after 10 million characters. The print head is also conservatively rated at 100 million characters.

The HP 2630 family is designed with user convenience in mind. Additional features include a self-test capability that assures you the printer is operational. Pedestal and desk-top versions blend into office environments.

Mechanical simplicity, long-life parts, and no adjustment—all contribute to ease of use and low cost of ownership.

These printers are ideal output and/or input devices for HP and other computers, calculators and CRT terminals. Interfacing is via RS232 (CCITT V.24) and 20mA current loop options on the HP 2631/2635, plus differential I/O, 8-bit parallel TTL, and HP-IB* options on the HP 2631.

The U.S. price for the HP 2631 printer is $3150 and $3450 for the HP 2635 printing terminal. OEM discounts are available.

It is difficult to reproduce here the quality print produced by these printers. **Request a live demonstration or more information by checking "B" on the reply card.**

---

*The Hewlett-Packard Interface Bus (HP-IB) is Hewlett-Packard's implementation of IEEE Standard 488-1975, "Digital Interface for Programmable Instrumentation."

Continued from page 2

engineering. Typical industrial applications range from monitoring offshore oil drilling to counting and routing wine bottles.

Decouple and delegate

The HP 2240 has the innovative ability to decouple automation tasks from the computer. Timing, scanning, event synchronization, formatting, and interrupt tasks can all be delegated to the HP 2240.

One-line programs

An extensive set of high-level measurement/control commands is another innovation. Users delegate tasks with one simple program statement. Requests to perform a task are generated by write or print statements in familiar BASIC, FORTRAN, HP Assembly, or HPL languages, as shown on page 2. The HP 2240 stores the instructions in memory and executes them in sequence, without further computer interaction.

Self-test

Part of the HP 2240 microprocessor design is self-test. Built-in ROMs and a separate self-test fixture allow users to run off-line diagnostics. This feature can lower repair costs and speed installation.

The HP 2240, with a typical mix of analog and digital I/O cards, costs about $6,000. High performance automated test systems based on the HP 2240 range from $10,000 to $27,600. Volume discounts are available. (U.S. prices only.) **Check A for details.**

A million-in-one

A million bytes in one small box. That's how much memory Hewlett-Packard now packs in the "megabyte computer"—one million bytes of "fault control" memory in a 12¼ inch high HP 21MX package for only five cents a byte. Through the use of a memory extender, memory capacity for HP 21MX systems can be increased even further to a total of 1.8 megabytes.

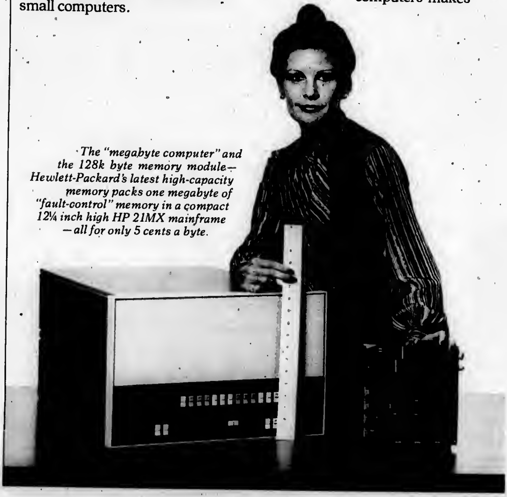
Increased density was made possible by a new 128k byte memory module based on 16K-bit, N-Channel, MOS/RAM memory chips—the first in use by a major manufacturer of small computers.

Better throughput

The expanded memory system is especially suitable for real-time, multiprogramming applications where high throughput is critical; for example, high-speed data acquisition and process control. With a megabyte or more of programs resident in memory, the delays inherent in swapping to and from a disc are eliminated.

HP gives you a bit more

The increasing popularity of large memories in small computers makes



The "megabyte computer" and the 128k byte memory module—Hewlett-Packard's latest high-capacity memory packs one megabyte of "fault-control" memory in a compact 12¼ inch high HP 21MX mainframe—all for only 5 cents a byte.

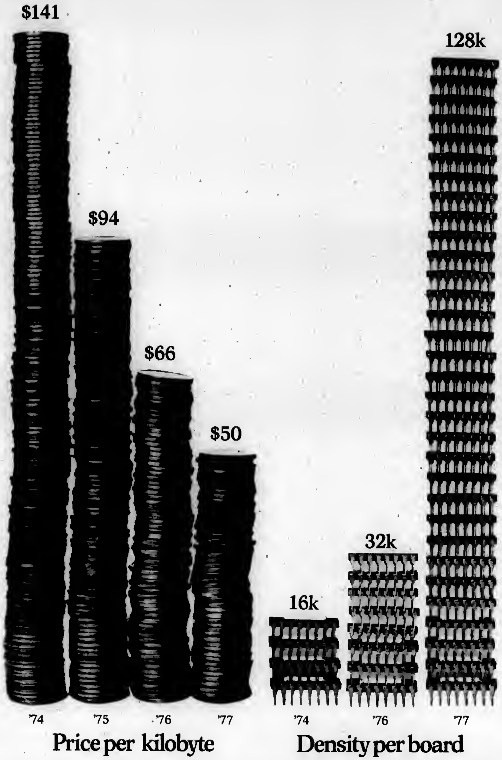
memory reliability a major contributor to overall system reliability. Recognizing this, Hewlett-Packard also introduced a new "fault control" capability, which provides for detection and correction of all single bit memory errors. This is accomplished through use of a standard 21-bit Hamming code. But, HP goes one bit further.

There is always the remote chance of a double bit error. We added a 22nd parity bit to the Hamming code, enabling us to detect all double bit errors. Programs will continue running and data will be protected even if a memory chip malfunctions.

The new "fault control" system is expected to provide a significant improvement in Mean Time Between Failure (MTBF) of basic HP 21MX memory modules. This is especially important to large memory systems. For example, we would expect an MTBF of roughly one year, without the probability of a failure on the "megabyte computer." Memory stays operational so maintenance can be performed on a scheduled rather than emergency basis.

When there's dirt in the air...

Memory-based systems, as you will read in the next article, can tolerate "unfriendly" environments. Such systems are excellent for remote, unattended locations where reliability is critical; for example, on off-shore oil platforms, on shipboard, or in planes. The go anywhere, "megabyte computer" is ready to work without the need of air conditioning, elevated floor, or lots of space.



Since Hewlett Packard's early commitment to semiconductor memory, we have been able to bring customers memory price decreases at an average of 30% a year, and memory density that has gone up and up. The most recent HP 21MX memory system using 16k RAMs quadruples memory board capacity from 32k to 128k bytes.

A nickle a byte

Density and reliability are not the only advantages of semiconductor memory. Cost savings is another. The new 128k byte memory module is priced at $6,400 (U.S. prices only)—just five cents a byte. "Fault control" memory is optional and available as a controller and associated check bit arrays. Existing HP 21MX customers can easily upgrade to larger memories.

More information on HP's large memory system is available. **Just respond to C on the reply card.**

Think big, even if you start small

With RTE-M, Hewlett-Packard's new real-time operating system, you can use big memories. RTE-M, software for HP 1000 and 21MX computers, can handle HP's memories up to 1.8 million bytes. But, you can start a system with as little as 32k bytes of memory.

M is for memory

RTE-M is memory-based, which ensures extremely rapid response time, within hundreds of microseconds. All system software and user programs are resident in main memory where they are instantaneously available for execution. There are no time delays caused by transferring programs in and out of main memory.

Good response time is further assured by a user-defined, flexible scheme for assigning priorities. Tasks are executed according to their specified priority as computer time becomes available. A time-critical program is guaranteed full and immediate computer attention and is run at optimum speed.

Flexibility further distinguishes RTE-M: it comes in three modular versions. Each customer chooses the tailored version that best matches his or her requirements. There's no hardware and software overhead.

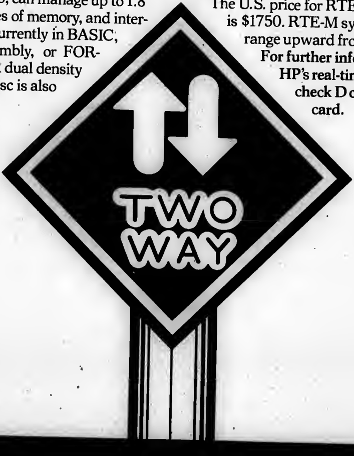
The simplest system configuration supports a single terminal with 32k to 64k bytes of main memory. Intermediate systems support multiple terminals, 48 to 64k bytes of memory, and full real-time, multiprogramming. The high-capacity system offers all the features of the above two, can manage up to 1.8 megabytes of memory, and interacts concurrently in BASIC, HP Assembly, or FORTRAN. A dual density flexible disc is also available.

A two way street

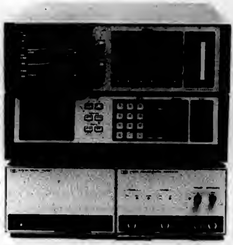
All members of HP's RTE family—RTE-M, and disc-based RTE-II and III—are compatible. RTE designers went to great lengths to ensure that in terms of the programmers' and operators' interface-system prompts, operator commands, programmatic calls, and error messages are identical for all versions of RTE.

Program statements of the operating system and the file manager are alike; program transportability is assured within the three RTE-M versions. Transporting programs, in either direction, between RTE-M, RTE II, or III requires only minor, if any, changes. It is like a two way street. Upgrading is simple, as is adding multiple small systems supported by a larger program development system.

The U.S. price for RTE-M software is $1750. RTE-M systems range upward from $21,000. **For further information on HP's real-time systems, check D on the reply card.**



New & Noteworthy



Can you find the computer in this photograph?

21MX K-Series computer components are being "buried" alive at HP

The Santa Clara, California instrument division integrates the K-Series into its own products because the "K" offers the high processing power and microprogramming capability of 21MX computers in component form, on a single, low-cost board.

The K-Series is at the heart of the HP 5420 digital signal analyzer, which accurately measures signals associated with noise and vibration. HP 5420 applications include analyzing the dynamics of structures from bridges to automobile frames, measuring spacecraft noise levels, and studying aircraft wing vibrations.

With K-Series intelligence, the HP 5420 is totally interactive, allowing users to set up, display, and control all measurements from a clearly defined set of front panel keys. During measurement set up, for example, operators press a key and a menu appears on the screen, listing all possible measurement functions. This assists even inexperienced operators in making the correct measurement selection. Operators spend less time setting up a measurement, and more time analyzing results.

The HP 5420 performs three basic tasks in every measurement application, as described below. Embedded in the HP 5420, the "K" provides the speed, power, and flexibility necessary to accomplish them.

Task one

Sample one or more analog signals and convert them to digital signals.

High direct memory access rates are essential in performing these analog-to-digital conversions. The K-Series is a high-performance, 16 bit minicomputer with a 650 nanosecond cycle time—many times faster than traditional microprocessors. Also, the "K" board's flexibility makes it easy for OEM's to add an extended arithmetic processor board for even faster data manipulation.

Task two

Compute the desired measurements on the signals and store them in memory.

The advanced algorithms critical to these measurements require speed, memory, and computational capability well beyond a simple microprocessor...or even most minicomputers. The "K" board contains a full 24 bit microprocessor with which OEM designers can easily microcode specialized routines into read-only memory, where they can be permanently stored.

Task three

Display results on the CRT screen, plot, or process them further.

Because of the computational capability of the "K," measurement results are shown simultaneously, while the analyzer is still performing fast data acquisition. Further analysis is provided using preprogrammed post-measurement operation, and results can be stored on a removable tape cartridge.

The HP 5420 digital signal analyzer is priced at $29,900. The 21MX K-Series board costs $1475 and can be volume-discounted. (U.S. prices only). **Check E and F on the card if you wish more information.**

Get your HP1000 off to a fast start with RPL

Finally, it's as easy to turn your computer on in the morning and off at night as it is to flip the light switch in your office.

HP 1000 computer systems now have a standard remote program load (RPL) capability which lets users automatically "boot-up" their systems by simply pressing "power-on."

RPL/Auto Boot-Up loads and starts the operating system, and allows complete reloading of user software from disc, magnetic tape, or over a communication line into memory—without once touching the computer's front panel.

With RPL, customers can also develop their own applications for start-up of remote, unattended systems, valuable in distributed processing. **Check G on the reply card for more information.**

HEWLETT PACKARD

Hewlett-Packard Computer Advances/Nov. 1977

Hewlett-Packard

Computer Advances

Direct Response Card

HP is pleased to provide you with literature or answer specific questions regarding any computer advances which intrigue you.

	Send more information	Please contact
A. HP 2240 Measurement/control subsystem	☐	☐
B. HP 2631/2635 Printers	☐	☐
C. HP Large memory systems	☐	☐
D. HP Real-time systems	☐	☐
E. HP 5420 Analyzer	☐	☐
F. HP 21MX K-Series components	☐	☐
G. HP 1000 with RPL	☐	☐

Computerworld

Name

Title Company

Address

City State or Province

Zip or Postal Code Country Telephone

CW 11/77

Hewlett-Packard

Computer Advances

Direct Response Card

HP is pleased to provide you with literature or answer specific questions regarding any computer advances which intrigue you.

	Send more information	Please contact
A. HP 2240 Measurement/control subsystem	☐	☐
B. HP 2631/2635 Printers	☐	☐
C. HP Large memory systems	☐	☐
D. HP Real-time systems	☐	☐
E. HP 5420 Analyzer	☐	☐
F. HP 21MX K-Series components	☐	☐
G. HP 1000 with RPL	☐	☐

Computerworld

Name

Title Company

Address

City State or Province

Zip or Postal Code Country Telephone

CW 11/77

First Class
Permit No. 141
Cupertino,
California

Business Reply Mail
No Postage necessary if mailed in the United States

Postage will be paid by

Hewlett-Packard
11000 Wolfe Road
Cupertino, CA 95014

Attn: Computer Advances

First Class
Permit No. 141
Cupertino,
California

Business Reply Mail
No Postage necessary if mailed in the United States

Postage will be paid by

Hewlett-Packard
11000 Wolfe Road
Cupertino, CA 95014

Attn: Computer Advances

Tektronix 4025 CRT Turns Alphanumerics to Graphics

BEAVERTON, Ore. — A raster scan CRT terminal which displays alphanumerics but also converts that data into graphics has been introduced by Tektronix, Inc.

The Model 4025 reportedly uses a data storage technique dubbed a "virtual bit map" in which alphanumerics and graphics are referenced in the same display list, but stored separately in read-only memory and random-access memory and random-access memory respectively.

When the terminal's controller scans its display list, it summons the alphanumerics and graphics as needed from their respective memory locations, Tektronix said. This method allows users to scroll alphanumeric and graphics data together on the terminals' CRT screen, according to the company.

Tektronix characterized the 4025 as the first raster scan CRT terminal to integrate alphanumeric and graphics data in this way.

One of the advantages of the virtual bit map technique is that it allows the terminal to make 8.5- by 11-in. hard copies of its alphanumeric and graphics data on a Tektronix 4631 hard-copy unit.

The product also connects to Tektronix's 4662 plotter and to the firm's 4924 digital tape recorder, a spokesman said.

Links to Hosts

Based on a Motorola 6800 microprocessor, the 4025 was designed not as a stand-alone unit, but as an interface to host computers, with which it communicates at 9,600 bit/sec, according to the spokesman. A standard 4025 provides an RS-232 full-duplex interface; an RS-232 half-duplex interface is optional.

The terminal's screen, which consists of a workspace for graphics and a monitor area for user-computer communications, measures 12 in. diagonally and holds 34 lines of text with 80 char./line, Tektronix said.

The standard character set reportedly includes 64 lower case and 96 upper case Ascii characters in an 8 by 14 dot matrix.

The 4025 typically holds a 4K-character display memory expandable to 8K, 16K and 32K characters, the spokesman added. Line frequency ranges from 49- to 61 Hz and power consumption is 295W maximum at 125Vac.

Equipped with a standard typewriter keyboard rather than an Ascii layout, the terminal provides 16 function keys along the top of the keypad and 12 number keys along the side.

In the usual operating mode, the 12 number keys control the 4025's cursor; in the numeric lock mode, they form a numeric pad for data entry, the company said.

Typical keyboard editing functions include line delete, character delete, line insert and character insert.

Software provided with the terminal includes the Plot 10 package, which Tektronix said allows users to turn data files into bar graphs, histograms, line graphs and pie charts.

The 4025 costs $3,595 ($3,307 in OEM quantities) and leases for $189/mo on a one-year contract. Deliveries will begin Nov. 21 from Tektronix's Information Display Group, P.O. Box 500, Beaverton, Ore. 97077.

No Graphics

BEAVERTON, Ore. — Tektronix's 4025 represents just one of two recent additions to the company's 4020 terminal series. The other newly introduced terminal — the 4024 — is identical in most respects to its sister product.

Unlike the 4025, however, the 4024 displays alphanumeric data only, Tektronix explained.

A standard 4024 costs $2,995 ($2,755 in OEM quantities) and leases for $157/mo on a one-year contract.

Data Set Unveiled

ESCONDIDO, Calif. — A multispeed synchronous data set for local metallic telephone circuits has been announced by the Teleproducts Division of Designed Enclosures, Inc. (DEI).

Designated SDT-I, the unit is strap-selectable to operate at 2,400-, 4,800- and 9,600 bit/sec and 19.2 kbit/sec. It operates over four-wire, full-duplex dc metallic circuits and is reportedly capable of operating at a distance of 15 miles over unloaded cable.

The set costs $395 from DEI at 563 N. Citracado Parkway, Escondido, Calif. 92025.

Datotek Designs Encryption Unit

DALLAS — A portable, self-contained, desktop electronic encryption unit has been announced by Datotek, Inc.

Designated the DC-26, the unit is compatible with the company's recently announced DH-26, a handheld calculator-like enciphering device. With a full-size keyboard and thermal page printer, the DC-26 is said to provide rapid data entry plus hard copy output.

The DC-26 can be used as a central or base-station encryption unit, a spokesman noted.

Operation of the DC-26 requires no special experience, Datotek said.

As the operator keys in the message to be enciphered, the data is first displayed, scrambled in five-character groupings and then printed after the sixth character is entered, the firm said. Text corrections can be made.

Datokek's proprietary key generator is said to provide an almost infinite number of user-selected key variables, making the possibility of unauthorized interception remote.

Display is a 16-segment, LED alphanumeric type. The DC-26 utilizes a thermal 5 by 7 dot matrix printer with a maximum line length of 80 characters and prints 30 char./sec.

The basic unit is priced at $6,800 from Datotek at 13740 Midway Road, Dallas, Texas 75240.

TURNKEY PACKAGES
HEWLETT-PACKARD MINICOMPUTERS

*SUCCESS-PROVEN PACKAGES INSTALLED AND MADE OPERATIONAL BY THEIR DEVELOPERS.

*FIXED PRICE AND SCHEDULE WITH HARDWARE/SOFTWARE LEASING AVAILABLE TO QUALIFIED CUSTOMERS.

*MINIMUM HARDWARE CONFIGURATION INCLUDES 50 MB DISK, 200 LPM PRINTER AND (2) TERMINALS — $870/MONTH.

*EXPANDABLE TO 400 MB DISK STORAGE; 18 TERMINALS WITH SINGLE-PROCESSOR; 24 TERMINALS WITH DUAL PROCESSOR; RJE.

*TWO-SECOND AVERAGE RESPONSE TIME GUARANTEED FOR UP TO EIGHT ON-LINE LOCAL TERMINALS IN SINGLE-PROCESSOR CONFIGURATION.

DISTRIBUTION CONTROL
- CUSTOMER INFORMATION
- SALES ORDER RECORDING
- CREDIT VALIDATION
- REMOTE/LOCAL TERMINAL
  - B/L PREPARATION
  - SHIPPING CONFIRMATION
- BILLING PREPARATION

$360.00/MO COMPLETE

MATERIAL CONTROL
- SALES ORDER ENTRY
- PARTS RECORDS
- BILLS OF MATERIAL
- PURCHASE ORDERS
- INVENTORY TRANS'NS
- MASTER SCHEDULING
- ORDER POINT PLANNING
- MATERIAL REQ'TS PLANNING (MRP)
- WORK ORDERS
- KITTING

$800.00/MO COMPLETE

MULTI-LOCATION INVENTORY CONTROL AND PLANNING
- PARTS/LOCATION RECORDS
- PARTS PICKING
- ECONOMIC ORDERING
- P.O. PREPARATION
- PARTS CATALOG PREPARATION
- MATERIAL COST DISTRIBUTION
- CYCLE COUNTING

$700.00/MO COMPLETE

SHOP FLOOR CONTROL
- ROUTING RECORDS
- ORDER LAUNCHING
- SHOP PACKET PREPARATION
- W-I-P TRACKING
- WORK-CENTER SCHEDULING
- WORK-CENTER LOADING
- LOAD PEGGING TO WORK ORDERS
- CAPACITY PLANNING REPORTS

$1,000.00/MO COMPLETE

CALL DON WHIPPLE (213) 595-5601
DATA SYSTEMS FOR INDUSTRY
3450 E. SPRING STREET, LONG BEACH, CA 90806

Users' Report...

"Winning Proposal" Winning Big

A step-by-step guide to proposal preparation is now helping many computer/EDP firms score big wins in their proposal efforts. Users of the book, entitled *How to Create a Winning Proposal*, report an impressive 42% average increase in the success-ratio of their proposal projects. Of the companies polled, 68% attributed their successful track record to the guidelines provided in the book.

Dubbed "*Winning Proposal*" shortly after publication, the much-needed volume has rapidly become an international standard guide for use in both government and commercial proposal efforts requiring a high level of sophistication. It covers the entire proposal process from start to finish . . . giving detailed instructions on contents, structure and methods of preparation for solicited as well as unsolicited proposals. Technical, cost and management section checklists are included to ensure the proposal team of covering all the important bases.

". . . a nuts-and-bolts book, functionally prepared for usability as well as readability."

Microwaves Sept. 1976

That "Winning Proposal" is effective in proposal preparation is evidenced by its wide use in GSA, DOD, NASA and the military . . . as well as in varying sizes of national and multi-national corporations. For many project managers, it is a virtual lemonade-stand in the Sahara because of the valuable assistance it provides. All agree that the most outstanding feature of the book is usability. It enables the user to actually plan, write and submit a superior proposal with a high win probability.

". . . a complete guide to planning, writing and submitting a winning proposal."

Convair Managair Feb. 1977

The authors cover government requirements in an overview of the U.S. procurement network, how it works, and how the proposing firm can increase its effectiveness in competing for contracts. Excellent guidelines are given on how to analyze and respond to RFP's, RFQ's and IFB's. Simplified formulas enable accurate costing-out of engineering, R&D, service, manufacturing and production projects.

Copies of *How to Create a Winning Proposal* are available pre-paid from Mercury Communications, Inc. 730-G Mission St., Santa Cruz, CA 95060. $65 includes 3-5 day delivery inside the U.S. In California add $3.90 tax. For outside the U.S., $76 (int'l money order) includes air delivery. To order C.O.D. call 408 425-8444.

From Facsimile to Conferencing

Diversity of Electronic Mail Systems Examined

By Ronald A. Frank
CW Staff

LOS ANGELES — Electronic mail systems are already feasible from a technological standpoint and several of these systems are already in operation, according to panelists at the Interface West conference here recently.

Einar Stefferud, president of Network Management Associates, Inc. said electronic mail is used to define a variety of systems. The term is applied to networks ranging from facsimile systems up to full computerized conferencing systems.

Facsimile systems are analog connections and include terminal-to-terminal communications. They allow picture image transmission and the sending of signatures, but electronic retention of the information is difficult.

Direct-wire teletypewriter systems are digital and add character code transmission. But these cannot transmit drawings or pictures and they require keyboarding and printing in order to be readable. Electronic retention is also difficult, he said.

Teletypewriter message-switching systems are next in order of sophistication and these feature store-and forward transmission of messages from terminal to terminal. These also require keyboarding and printing, but electronic retention of the information is still difficult.

A step more advanced are computer message systems using time-sharing systems connected to remote CPUs. These allow intracomputer file-to-file text transfers so long as the sender and receiver terminals are connected to the same CPU, Stefferud said. These systems require training, specialized equipment and software but they introduce the concept of computer processing of messages.

Computer network message systems operate within a network of computers and allow intercomputer file-to-file text transfers.. These also have a requirement for training users and need specialized equipment and software. However, they add the dimension of a large connected community, he said.

Conferencing Systems

The most sophisticated electronic mail systems are the computer conferencing systems that have common shared message file access. These support group discussions but also require user training, Stefferud noted.

An example of the latter type of system has been operating on the Arpanet for some time. Called Message Group, this informal teleconference was designed to explore the potentials for computerized message systems in addition to defining what form these should take.

Experience with this system has determined that electronic mail systems can be broken down into four basic categories, Stefferud said. The first is concerned with preparation and modification of the information.

Next, the question of packaging and delivery of the text must be examined. This involves building an envelope structure within which the transmitted information can travel. This category is also concerned with information addressing and includes the creation of electronic mailboxes for conference participants.

Packaging and delivery also includes provision for the transmission of data and failure indications when information is not sent correctly. In cases of network malfunction, rerouting must also be provided for.

On the receiving end, there has been a difference of opinion on the need for acknowledgement of messages, Stefferud said. Some believe that this is necessary for participants to know that a message has been received by a certain party, but others feel that an acknowledgement implies a need for an answer and thus is not necessary..

CW at Interface

Authentication of messages as being from authorized parties has been a controversial issue as well as whether or not a public archive of transmitted messages should be established. If such an archive is kept, the question of ownership of the information will also have to be studied, he said.

The third category is concerned with filing and retrieval of messages and includes file sharing and purging if that is to be a goal. The fourth category leads to the creation of data banks although these are not technically part of the electronic mail problem directly, Stefferud said.

In response to a question from an attendee, Stefferud admitted that the question of security had been left off the list. In general, it is often more important to know that the system has been compromised rather than to try to prevent it from happening. If a compromise is discovered, measures can be taken to minimize its impact, he explained.

Experience with electronic mail systems proves that there is still a need for human interaction, however, Stefferud said. In cases where there have been serious disagreements between electronic mail participants, it is not unusual for someone to pick up the phone and talk directly to the other party out of sheer frustration, he said.

Often, text loses the marginal contexts that can only be captured during actual voice conversations. When this occurs, the parties may actually experience a divergence of understanding that can ony be solved by talking directly, he explained.

Several attendees asked when electronic mail systems will become more widely available. The heart of the issue is a need for timely man- or machine-readable communications, according to Robert Field, vice-president of Tymnet, Inc.

The On Tyme service introduced by Tymnet allows terminal-to-terminal communication of messages on his company's network, he said. The service transmits 500- to 1,000-word messages for between 20 cents and 80 cents depending on terminal type and geographic location, he said.

TSI

The Professional Seminar Clearing House
and
ETHNOTECH, INC.
Are proud to announce a one-day seminar by
GERALD M.
WEINBERG
DONALD C.
GAUSE
DANIEL P.
FREEDMAN

Measuring And Increasing User Satisfaction–

This program demonstrates practical methods for actually measuring user satisfaction, and then provides practical techniques for raising the level of that satisfaction.

Plan now to bring your team of DP Managers, Systems Analysts, Designers, and Users to benefit from this break-through in User/DP inter-action.

For a detailed course outline, simply call us, collect, at (212) 764-3070, or complete and mail the coupon below.

CW-4

TSI Sales and Marketing, Inc.
19 West 44th Street, New York, N.Y. 10036

Gentlemen: Please send me the detailed course outline for **MEASURING AND INCREASING USER SATISFACTION — New Techniques by Weinberg, Gause, and Freedman.**

☐ Please place me on your mailing list.

Name__________
Title__________
Co.__________
Dept.__________
Address__________
City__________ State__________
Zip__________ Phone__________

DEALERS...AJ WANTS YOU

Anderson Jacobson, a leading manufacturer of data communications products, would like to introduce you to our new minicomputer, the AJ System 1500. And we need your expertise to make our small business system successful.

Here's what we have to offer:

- Good margins
- Exclusive territories
- Business BASIC
- A small business nucleus of application software at *no charge* to you
- Excellent client accounting software, also at *no charge*
- A multi-programming, multi-terminal system that is *fully* expandable
- AJ field service available in selected areas of the United States
- Floppy or hard disk systems

If your are interested in being a part or AJ's successful future, call or write Bob Reed, National Marketing Manager, for more information.

Computer Systems Division

ANDERSON JACOBSON

Anderson Jacobson Inc., 521 Charcot Avenue
San Jose, California 95131 • (408) 263-8520

Citibank Reported Running Private Packet Net

CW at Interface

By Ronald A. Frank
CW Staff

LOS ANGELES — A private packet-switched network has been put into operation by Citibank in New York, according to Seymour Ratner, assistant vice-president.

Speaking at a session on data switching networks at the recent Interface West conference here, Ratner said the packet net is called Citinet and is based on technology used in the Arpanet.

Citinet has been operational since March and is presently being used for management information systems applications connecting various mini-based systems developed by the bank. Ratner said that he could not disclose the number of processors operating on the packet net but that included are minicomputers from Honeywell Information Systems, Digital Equipment Corp., and Interdata Corp.

Software for Citinet was developed with support from Bolt Beranek and Newman, which developed Arpanet software for the Department of Defense. Although much of the Arpanet software is in the public domain, some modifications were made to handle the Citinet operations.

The private packet net uses an RS-232 electrical interface together with character-stuffing (instead of bit-stuffing) principles, and its link protocol is based on the Higher-Level Data Link Control (HDLC) format found in the CCITT X.25 standard. Some changes were made to the HDLC protocol for Citinet, Ratner said.

Current Use

At present, the packet net is being used only for host-to-host data transfers, but terminal-to-host and terminal-to-terminal capabilities are being considered, he added.

Using the minicomputers, it cost about $25,000 to add a new processor node to the network compared with much higher costs in other packet nets such as Arpanet where the packet technology was developed. Software interfacing to support a specific type of minicomputer on Citinet costs about $75,000 per machine type, Ratner said.

Session chairman Ralph Berglund, a consultant, said the Citinet is typical of the way in which private networks will apply the virtual circuit switching techniques now emerging. These nets will extend the distributed data base and distributed processing concepts to allow multiple terminal and multiple host communications, he said.

The recent CCITT adoption of X.25 will lead to "substantial international development of an expansion of public virtual-switched circuit networks in the coming years," according to Berglund, and as evidence he cited IBM's introduction of an X.25 interface for the 3270 CRT system for the Datapac network in Canada and the Transpac network in France.

Vendor's network architecture such as IBM's Systems Network Architecture, DEC's Digital Network Architecture and Univac's Distributed Communications Architecture — should be related to the public data networks, Berglund said. Both the public nets and the architectures are part of a new era in virtual circuit switching systems, he noted.

Although most of the announced network architectures are designed for virtual circuit switching, the NCR Distributed Network Architecture "seems to provide for both virtual circuit and datagram interfaces," he said.

3340-A2
(2) 3344-B2F
AVAIL. DEC 1
LEASE OR SALE
Call:
Nick Dibari
COMDISCO
312-698-3000

Announcing a small breakthrough.

TI's compact Model 763 send/receive terminal with built-in bubble memory.

The new *Silent 700** Model 763 Memory Send/Receive Terminal is a data entry breakthrough in a small package. It's the table-top terminal with powerful ASR capabilities...all built-in.

Magnetic bubble memory. Built-in bubble memory means you can enter and edit data off-line, then transmit it when you want to.

The bubble memory is expandable, in the terminal, to 80K bytes. And it's non-volatile, so it retains data even when the power is off.

With the 763 you have the standard ASR functions such as playback on/off, record on/off, rewind playback and record, and playback forward and reverse. And the built-in, easy-to-use text editor brings new power to data handling.

***Silent 700* Performance.** Virtually silent 30 characters-per-second printing, a hard copy you can keep, and excellent value is what the 763 offers with its *Silent 700* heritage.

It's microprocessor based, which means fewer components for more reliability, less weight and size.

There's a keyboard that's as familiar to use as a standard typewriter, and there's TTY current loop or EIA interface standard.

The 763 send/receive terminal...a breakthrough in a small package.

Backed by TI. When you buy from TI, you are backed by our worldwide network of factory-trained service personnel. And by the resources of Texas Instruments...the company that makes technology affordable.

To find out how the 763 can benefit your business, fill out and mail the coupon, or call your nearest TI sales office, or Terminals and Peripherals Marketing at (713) 494-5115, extension 2124.

TEXAS INSTRUMENTS
INCORPORATED

Yes! I am interested in the 763 Memory Terminal.
☐ Please have your representative call me.
☐ Please send me more information.
Name________
Title________
Company________
Phone________
Address________
City________ State____ Zip____
Mail to: Texas Instruments Incorporated, P.O. Box 1444,
M/S 784, Houston, Texas 77001

SILENT 700
electronic data terminals

15-11-CW

*Trademark of Texas Instruments

Copyright© 1977, Texas Instruments Incorporated

TEXAS INSTRUMENTS.

ITEL'S ADVANCED SYSTEM/6. UNTIL NOW IT ONLY EXISTED IN THE FUTURE.

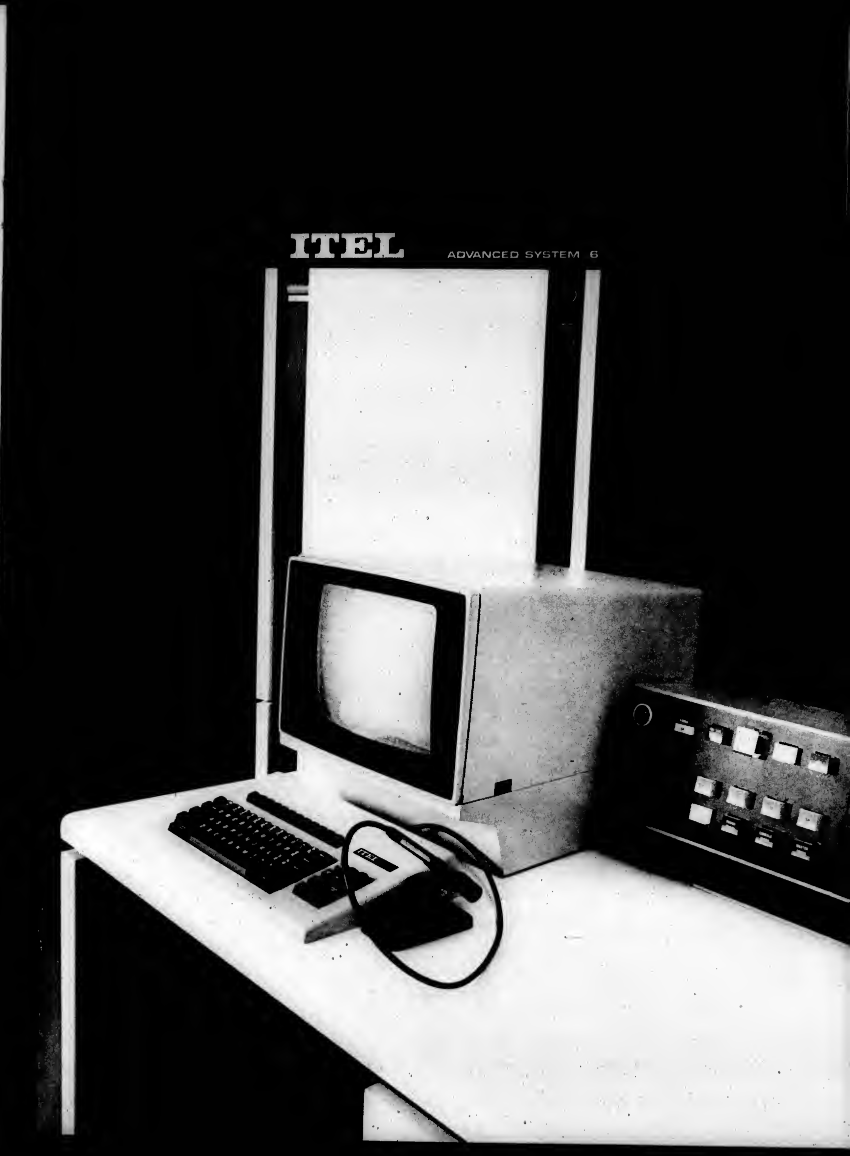
A revolution in price/performance alternatives, the Advanced System™ 6 processor complex is Itel's most technologically advanced large-scale computing system. It's not a copy or re-engineering of any other system. In terms of price/performance, the AS/6 outperforms both the IBM 370/168-3 and the newly announced 3032. And utilizing high-speed Large-Scale and Medium-Scale Integration circuitry, the AS/6 is three to four times more powerful than our AS/5.

Like the AS/4 and AS/5, Itel's AS/6 is designed to be a direct replacement for its IBM equivalents and is fully compatible with IBM 360 and 370 software. But our AS/6 has several clear advantages over its IBM counterparts.

For example, the AS/6 Model 7032 Central Processor takes the concept of High Speed Multiplication one step further and gives you High Speed Arithmetic, including High Speed Divide. And the 48K expandable Reloadable Control Storage is a standard feature on this new Advanced System. In addition, the AS/6 is air cooled, so there's no need for the costly, intricate water cooling systems required by comparable IBM CPU's. Dramatic technological advances also permit the AS/6 to be lighter, take up less floor space and consume less power than equivalent systems.

With the new AS/6 and the rest of our Advanced System computer line, Itel offers a broad range of sensible alternatives with substantial price/performance advantages. But then, when it comes to price/performance, Itel has always had a considerable edge. Our AS/4 and AS/5 are alternatives designed for the future. And now we're taking the future a step further.

ITEL CORPORATION
Data Products Group
One Embarcadero Center
San Francisco, California 94111
Telephone: (415) 955-0000



ITEL
ADVANCED SYSTEM 6
ITEL

To Improve Net Monitoring

Human Factors Held Vital to Control Centers

LOS ANGELES — Human factors are an important part of a technical control center designed to monitor the performance of data communications networks, according to John Nuwer, supervisor of data transmission for Atlantic Richfield Co. (Arco).

Describing the switched private coast-to-coast network operated by Arco in the continental U.S. and Alaska, Nuwer said that the carrier must take responsibility for network diagnostics and maintenance.

Technical control centers must not be built on such a complex level that they exceed the capabilities of the people that will be monitoring and staffing them, he said.

In this regard, it is often wise to make a distinction between the information needed by the computer operators and that needed by the communications maintenance people. Computer operators are only interested in knowing whether a terminal is in operation and they don't need technical equipment to monitor such parameters as phase jitter.

Patch panels that allow individual lines to be monitored should be installed in technical control centers, where communications technicians can monitor exactly what is happening on a particular line, Nuwer said.

Interface Monitor Portable

PROVIDENCE, R.I. — A portable, rechargeable version of the Model 60 EIA interface monitor and breakout panel is being offered by International Data Sciences, Inc.

Featuring two AA nickel-cadmium batteries that allow the unit to operate from 110 VAC while the batteries are being charged, the test set provides access to all 25 conductors of the EIA RS-232 interface, the firm said.

Twelve LEDs monitor signals and two LEDs sense whether signals meet EIA specifications, according to a spokesman.

Twenty-four switches allow all interface conductors except frame ground to be individually interrupted, allowing isolated testing and observation of terminal and modem signals, he said.

The unit sells for $250 from International Data Sciences, Inc., 100 Nashua St., Providence, R.I. 02904.

CRT Aids Development

PHOENIX — A CRT terminal designed for use with the Exorciser development system was unveiled by Motorola Semiconductor Products, Inc.

The Exoterm 100 provides communications through a keyboard at rates up to 9,600 bit/sec. A video display that uses a 12-in. diagonal CRT provides response within 24 lines of up to 80 characters each, it was reported. All activities are coordinated by a micro-executive module in conjunction with various control and application modules.

Efficiency is enhanced by 12 function keys that are reportedly encoded to directly invoke functions to the Exorciser at each of its three command levels. Communication between the terminal and the Exorciser system is provided by an RS-232C interface.

The price of the terminal is $2,200 from Motorola Semiconductor Products, Inc., P.O. Box 20294, Phoenix, Ariz. 85036.

THE COMMANDING GENERAL

Why our new General Ledger System enjoys a commanding lead over the competition.

Attention!

Our new General Ledger/Financial Analysis System, G/L PLUS, deserves a twenty-one gun salute. Because even though it's brand new, its remarkable features have promoted it into a leadership position over everything else on the market.

First of all, the system is simple to use, with a revolutionary file design that allows unsurpassed efficiency and flexibility.

Secondly, the system is easy to maintain. We made it so compact that it comprises only 18 programs instead of the typical 50 to 200.

It's also the most comprehensive system available. Because we filled it with unusual features like automatic interface to any application subsystem; extensive planning and modeling facilities; complete user-defined editing and user-controlled error recycle; and comprehensive graphic reporting.

And of course, we included features like multi-corporate processing of both accounting and statistical data; extensive capabilities for any financial reporting requirement; consolidations, cost allocation, fixed and variable budgeting, exception reporting, foreign currency translation, and more.

Finally, there's a user-support program that includes not only installation, but a special user training school.

Now our Commanding General, G/L PLUS, is ready to stand inspection whenever you're ready. If you'll contact Bob Wilbur, we'll be proud to pass in review.

McCORMACK & DODGE CORPORATION
381 Elliot Street, Newton Upper Falls, MA 02164, (617) 964-6610

168
M35 or U35
25 mo. Lease
Jan. 1, 1978
Call: Pat Baker
COMDISCO
312-698-3000

Bits & Pieces

Self-Study Program Teaches Data Entry Skills

MINNEAPOLIS — A self-study multimedia course that teaches data entry skills to key-entry operators is available from Data 100 Corp.

The course consists of two audiotapes, an administrator's guide, an operator's guide and a reference guide. It covers operations of both the company's Keybatch key-to-disk and Model 77 key-to-diskette systems.

Operators can go through a series of audiotape lessons, workbook activities, hands-on exercises and self-evaluation procedures at their own speed. The entire process takes six to eight hours, Data 100 said.

The course is priced at $148 from Data 100 at 6110 Blue Circle Drive, Minneapolis, Minn. 55435.

Floor Mat From 3M Drains Static Charges From Personnel

ST. PAUL, Minn.— An electrically conductive floor mat which drains static charges from office personnel has been introduced by the 3M Co.

The Velostate forms an "island of protection" around computers and electronic office equipment, preventing loss of data and alteration of memory, the firm said.

Each mat comes in three sizes: 24- by 32 in., 4- by 5 ft. and 4-by 8 ft. They cost $30, $95 and $105 respectively from 3M at P.O. Box 33600, 3M Center, St. Paul, Minn. 55133.

Graphics Meet Set

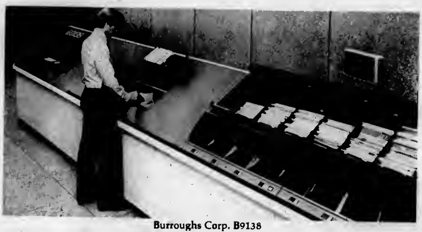
WAUWATOSA, Wis. — Jerusalem Systems here has announced a computer graphics seminar to be held Dec. 14 and 15 in Milwaukee.

Computer Graphics '77 will be run on four tracks, covering the industrial, business, government and utility computer graphics applications.

The cost of the seminar is $400 from the firm at 12201 W. Burleigh Road, Wauwatosa, Wis. 53222.

Correction

Media Recovery, Inc.'s automatic impact detectors [CW, Oct. 24] cost $6 in quantities of one to 12. The $2.50 price applies to OEM quantities of 100,000 or more.


Burroughs Corp. B9138

Micr Reader/Sorter Processes 2,600 Check/Min in One Pass

DETROIT.— A magnetic ink character recognition (Micr) document reader/sorter that reportedly can process 2,600 standard checks per minute and 131,000 encoded forms of mixed sizes in an hour has been introduced by Burroughs Corp.

The B9138 can read, endorse, microfilm and sort Micr-encoded documents in a single pass, the firm said. The system functions on-line under control of a central computer or off-line with its own internally stored programs, a spokesman noted.

On-line, the B9138 can be used with a B2800 or larger member of the Burroughs 800 family or with B3700 and larger computers in the 700 series.

The unit can be equipped with four to 32 sorting pockets in four pocket modules; each pocket is capable of holding up to 950 documents, the spokesman said. The system has 16,000 bytes of user memory expandable to 44,000 bytes.

Document-processing programs are loaded into the B9138 memory through its own 243,000-byte minidisk. Programs can be created, however, from the console keyboard, Burroughs said.

System features include bulk filing to facilitate retrieval, a built-in "jogging" mechanism for document alignment, electronic image tracking and double reading of each character.

System-to-operator messages in English and corrective-action instructions appear on the control console and on swivel-mounted

(Continued on Page 60)

DP Insurance Can Be Tailored

SAN FRANCISCO — Fireman's Fund Insurance Co. is offering a DP policy it said can be tailored by users to suit their operations.

The policy offers "all-risk" coverage for physical damage to equipment and tapes, cards and other forms of media. It also offers business interruption and extra expense coverage, Fireman's said.

This makes it possible to adjust the DP policy to the needs of those users with only a few terminals as well as those with more elaborate computer installations, a spokesman explained.

Physical damage coverage can be either on an actual cash value or on a replacement cost basis, he added. Separate limits can be established for owned, rented and leased equipment.

Coverage also includes dishonest, fraudulent or criminal acts of employees, he noted.

Extra expense coverage includes indemnification for use of outside DP equipment, additional payroll, emergency supplies and rental. The actual amount of loss less the deductible is paid at the policyholder's option.

Information about the DP policy can be obtained from Fireman's Fund at P.O. Box 3395, San Francisco, Calif. 94119.

Finally, a **SMART ALEC** that everyone needs!

- Communications
- Extended Basic High Level Language
- Keyboard/Printer Separation
- Sophisticated Word Processing
- Exclusive Speller
- Mail List
- Business Application Packages
- All in the Same Easy to Use Equipment
- Smart Alec Gives Your Terminal Equipment These Capabilities
- Or ACS Will Supply a Complete System
- All at an Incredibly Low Price

Smart Alec is looking for sharp, aggressive sales people for major marketing areas.

Smart Alec is just your type

Write: APPLIED COMPUTER SYSTEMS
615 N. Mary Avenue
Sunnyvale, CA 94086
(408) 733-3733

To the computer evaluator more interested in saving kilobucks than storing megabyte

If you want to increase computer productivity and at the same time cut computer costs, Prime can help. We offer a compatible family of computer systems equally adept at interactive data processing and computational timesharing. Systems that provide a CODASYL-compliant DBMS for sophisticated data management applications. Systems that can handle specialized applications with software like MUMPS and SPSS. Systems with number crunching performance in the same league as the 370/158. Systems that process more megabytes for fewer kilobucks than you ever thought possible.

Sure, some people pick Prime computers because they provide up to 8M bytes of main memory, 512M bytes of virtual memory, and 2.4 billion bytes of disk storage.

And others choose Prime because our PRIMOS operating system supports up to 63 simultaneous users programming in any mix of FORTRAN IV, COBOL, BASIC and RPG II.

Still others select Prime because our high-performance Prime 400 and 500 systems can run very large, multi-megabyte programs without gimmicky programming, and at speeds that rival many larger systems.

But ultimately they all put Prime first because our computers deliver mainframe functionality at a fraction of mainframe cost.

Find out how a Prime system costing from $100,000 to $350,000 can give you results you thought you'd have to pay up to 10 times more to get. Contact J. D'Angelo Marketing Manager, Prime Computer, Inc., 40 Walnut Street, Wellesley Hills, MA 02181, (617) 237-6990.

PRIME

Prime can help

Systems Offer Continuous Measurement

McLEAN, Va. — A series of performance management systems that are said to continuously measure system profile, buffer hits and misses, and millions of instructions per second (Mips) on IBM 370/168, Amdahl Corp. 470V/6 and Univac 1110 computers has been announced by Tesdata Systems Corp.

Composed of five models (the MS-58C, MS-88A, MS-88B, MS-88C and MS-88D), the Alpha systems provide continuous measurement through real-time displays and report generation as system abnormalities occur, according to a spokesman.

This continuous measurement concept also provides an additional dimension to multisystem and/or decentralized data processing users through the availability of Distributed Measurement Networks.

These systems may be geographically disbursed and connected through standard communications interfaces to provide a centralized base of performance information.

Each Alpha system also operates on a foreground/background principle via the Tesdata disk operating system. Performance measurements are stored on a disk in the foreground, while system planning and trend reports are generated in the background.

An Alpha MS-88D with a 144-sensor data collection system can monitor the number of bytes transferred on all the previously mentioned CPUs, all channels and/or all devices as well as bytes transferred on up to 16 transmission lines including line retrieve and polling measures.

The Alpha series systems, including all support, training, documentation and software, range in price from $115,000 to $178,000, Tesdata said from 7900 Westpark Drive, McLean, Va. 22101.

Biomation Introduces Portable Logic Analyzer

CUPERTINO, Calif. — Biomation Corp. has introduced a portable logic analyzer that is said to be suited for the individual engineer's use in equipment design and for use in field testing by service personnel.

The 9-channel Biomation 920-D plugs into any available oscilloscope or CRT, a spokesman noted.

Other features include an auxiliary channel, a clock or event trigger delay, a 20 MHz record rate, combinational triggering and a 10 nsec "glitch" detection feature.

The unit's memory capacity is 9 bits by 256 words, using static random-access memory (RAM), the spokesman said.

The auxiliary channel can be used to record data as a conventional signal input channel for subsequent display; to mark and qualify trigger points; and to qualify the external clock input.

The unit records in two modes; one records until a trigger event is hit, the other records until a preset time after the event.

The unit stores both pretrigger and post-trigger data.

The 920-D is available for $1,295. Biomation Corp. is located at 10411 Bubb Road, Cupertino, Calif. 95014.

OCR-A Imprinter Available

PHILADELPHIA — Soabar, Inc. has introduced an OCR-A imprinter, the Model 341, which features a dial-set band head designed for quick copy changes and machine setup.

The machine's printband head permits dial setting of copy in either optical character recognition (OCR) characters, conventional characters or a combination. It provides four dial-set bands of copy maintaining up to 10 band/line, a spokesman said.

The Model 341 also incorporates a slide-in magnetic chase to hold metal-based, rubber mats for the imprinting of repetitive copy such as size, color and style.

Other features include a three-roller inking system, a positive feeding mechanism, two feed fingers, a self-stop counter and a flexible lamp for visibility when setting copy on the printband head.

The units sells for approximately $4,200 from Soabar at 7722 Dungan Road, Philadelphia, Pa. 19111.

NCS Brings Out Optical Mark Reader/Recorder

MINNEAPOLIS — National Computer Systems, Inc. (NCS) has introduced an optical mark recorder/reader designed for commercial and governmental use.

The Sentry 7005 can read and record nearly 7 million items of information from 2,400 reponse sheets every hour, NCS said. Because it eliminates the entire keypunch operation, the system can save data entry and processing time and money, a spokesman claimed.

The 7005, which features self-calibrating read heads and an automatic deskewing mechanism, handles a variety of forms, the spokesman added.

The recorder/reader is available in both stand-alone and on-line models. The on-line version feeds information directly to a host mainframe; the stand-alone model puts the information onto a standard reel-to-reel tape for future processing.

Options include a sorter that selects mismarked response sheets and a printer that encodes or abstracts information.

The Sentry 7005 is available for $49,500 from NCS' Equipment Division, 4401 W. 75th St., Minneapolis, Minn. 55435.

Micr Unit Out

(Continued from Page 57)

CRTs, with one CRT for each group of eight sorting pockets.

Visual indicators on the pocket stackers guide the operator in recovering a jam or missort, the firm said.

Purchase prices for the B9138 range from $226,500 for a basic four-pocket system to $593,700 for a 32-pocket system equipped with an ink-jet endorser and a microfilming module. The system will be available in the fourth quarter of 1978, Burroughs said from headquarters in Detroit, Mich. 48232.

WCS

Warner Computer Systems, Inc.

Warner Computer Systems, Inc., the fastest growing, major timesharing company is actively seeking

AUTHOR PROGRAMS

If you are an author and have a financially oriented product written in APL or Fortran, it should be on Warner.

We are extremely selective and market each author package extensively.

One of our authors has just reached FIVE FIGURES as his MONTHLY ROYALTY.

Please direct all inquiries to:
Mr. Ben Adenbaum, Vice President

Warner Computer Systems, Inc.
605 Third Avenue
New York, New York 10016
212 697-0110

Warner Computer Systems, Inc. is also seeking to acquire software or service bureau oriented companies. If your company presently has up to $500,000 annual sales, we welcome the opportunity to speak with you.

Please direct inquiries to Mr. Harvey Krieger, President.

Presenting the most dynamic business Opportunity since the Big Mac.™

A National ComputerLand Retail Franchise

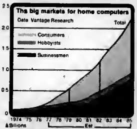
In 1967, you could have made a fortune selling burgers. Now, there are personal computers. Possibly the greatest opportunity since.

THE MARKET. Today, annual sales of microcomputers are over $100 million. By 1985, that total may top the $2 billion mark.

THE OPPORTUNITY. A ComputerLand retail franchise lets you in on this explosive market. The package includes everything you'll need: turnkey business system, intensive training, central buying and warehousing, national advertising . . . And more.

THE QUALIFICATIONS. Interest in microcomputers comes first. Next, desire to test your management and sales ability. Finally, an investment of about $100,000 for a fully stocked and outfitted store. Bank financing available for qualified applicants.

INTERESTED? Join our rapidly growing national franchise network. 24 stores now open. Key locations still available. Call (415) 895-9363 for instant action. Or, send the coupon for a detailed brochure.



ComputerLand™

Big Mac is a trademark of McDonald's Corp

Mail to E. E. Faber, President, ComputerLand Corp., 1922 Republic Avenue, Dept. CW San Leandro, CA 94577 (415) 895-9363.

Name ____________________ Occupation __________
Address ____________________ City __________
State ____________________ Zip ______ Phone __________

NMA Publishes COM Resources

SILVER SPRING, Md. — The National Micrographics Association (NMA) has expanded its offerings with the printing of four publications.

All About Microfilm Cameras covers the elementary principles of photography and film, microfilm facts and terms, microfilm cameras and accessories and maintenance of cameras. The 28-page booklet, designated CS6, is available for $2 per copy.

The *1977 Supplement to the Guide to Micrographic Equipment* covers computer output microfilm (COM) equipment introduced since the last supplement was published in 1976. The publication is designated RS23-1977 and sells for $14 to NMA members and $17 to nonmembers.

Basic Microfilm Standards, MS115-1977, deals with Internal Revenue Service standards which cover the microfilming of general books of account. Actually a collection, this publication sells for $8.50 to NMA members and $11 to nonmembers.

The *British Standard Specification for Microfilm Readers* specifies the characteristics of reading apparatus for microfiche and for microfilm in roll form, filmstrips, aperture cards and jackets. Included with the standard is a high resolution test fiche with 3,360 chart images at a reduction of 100X.

The package, BS 4191, is available at $18.50. The test microfiche alone, designated BS4191C, costs $12.50.

All publications can be ordered from NMA Publication Sales, 8728 Colesville Road, Silver Springs, Md. 20910.

Light Pens Bow

LOS ANGELES, Calif. — Two solid-state light pens, the LP-210 and the LP-211, have been introduced by Information Control Corp.

Each light pen is 6 in. long and weighs 2 oz.; each features a satin chrome finish and a retractable 48-in. cord, according to the company.

The LP-210 has a "Touch-Sense" actuator tip which is activated when the operator's index finger touches the pen's barrel. The LP-211 is fitted with a push-actuation tip that is enabled by pushing against the CRT faceplate, the firm said.

Prices for the LP-210 start at $450 and $475 for the LP-211, International Control said from 9610 Bellanca Ave., Los Angeles, Calif. 90045.

Zeta Cuts Cost Of Drum Plotters

LAFAYETTE, Calif. — Price reductions ranging up to 19% on its 12-in. drum plotters has been announced by Zeta Research.

Previously $4,950, the Model 1200 now costs $4,000. The Model 230, formerly $5,950, is now priced at $4,950.

The models 150, 160 and 170 now cost $3,650 compared with the old price of $3,950.

Zeta Research is located at 1043 Stuart St., Lafayette, Calif. 94549.

Kwik-File Has Storage Trays

MINNEAPOLIS — A line of file trays that can accommodate microfiche, tab cards, reports and statements has been introduced by Kwik-File.

Priced at $21.95 for the 4-in. size and $28.95 for a 12-in. model, the trays are available from Kwik-File, 2845 Harriet Ave. South, Minneapolis, Minn. 55408.

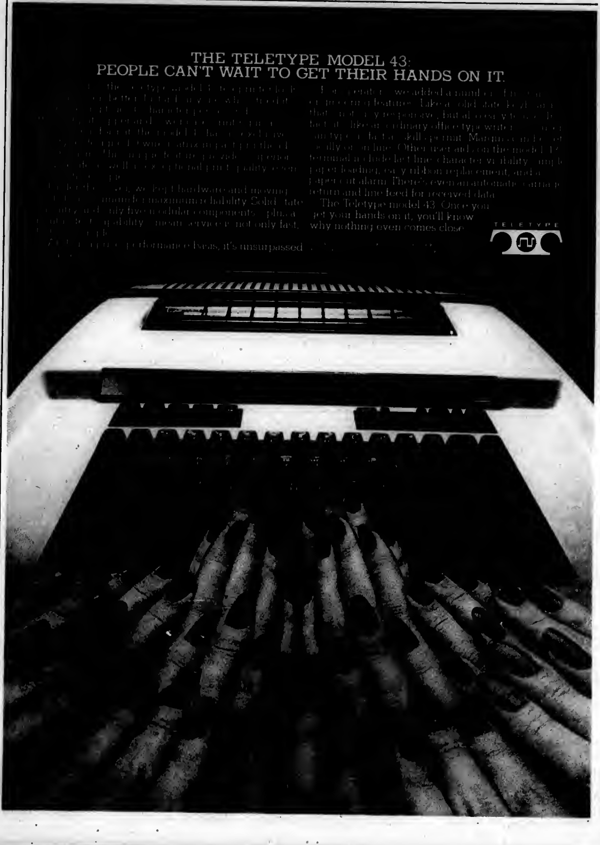
Formex Has Grid Paper

TEANECK, N.J. — Formex, Inc. has introduced continuous program grid paper.

The grids provide a visible guide of the printing positions that are being used in various programs. The grids are spaced for 6 line/in. and 10 char/in.

The paper sells for $84 a carton and quantity discounts are available, the firm said from 101 Cedar Lane, Teaneck, N.J. 07666.

OFF-THE-SHELF
Data General ®
microNOVA
Computers and Systems
Memories and Interface Boards
DASHER Printer and
CRT Terminals
The Computer Store has immediate delivery of entire systems, components and DASHER terminals.
the Computer Store, Inc
120 Cambridge St.
Burlington, MA 01803
(617) 272-6770
63 S. Main Street
Windsor Locks, CT 06096
(203) 627-0766


THE TELETYPE MODEL 43:
PEOPLE CAN'T WAIT TO GET THEIR HANDS ON IT.

The Teletype model 43. Once you get your hands on it, you'll know why nothing even comes close.

TELETYPE

Office Services Courses Set

NEW YORK — The American Management Associations (AMA) will offer two courses, "Organization and Management of the Office Services Function"; and "Managing Word Processing as an Office System."

The first seminar, lasting 2 1/2 - days will be open to 15 participants only and will cover such topics as choosing office equipment, controlling office supplies, in-house publications and getting the most for your communication dollars, a spokesman said. It will be held in New York on Nov. 21-23, in San Francisco on January 16-18, and in Denver on April 10-12.

"Managing Word Processing as an Office System," a three-day course, will involve a step-by-step approach to planning, implementing and managing a word processing center. It will be held in New York on Nov. 21-23.

Registration fee for the first course will be $375 for association members and $430 for nonmembers. The second course will cost $425 for members and $490 for nonmembers.

For further information, contact the American Management Associations, 135 W. 50th St., New York, N.Y. 10020.

Proxies Handled By OCR System

SPOKANE, Wash. — An optical character recognition (OCR) system that reportedly processes proxy cards automatically without presorting or punch-card preparation was introduced by the Key Tronic Corp.

The Proxyscan, fitted with special optical filters and increased illumination, can process proxy documents without restricting the types of marking implements to be used. The reading speed of the unit is 200 char./sec with an average throughput of 4,000 document/hr.

Documents may range in length from 2.5 in. to 8.75 in. and in height from 1 in. to 6 in. Shareholder identification number, issue number, the presence of one or two signatures, and up to 16 yes or no votes can be extracted in one pass, a spokesman said.

The Proxyscan consists of an automatic feeder, dual horizontal data reader, sort pocket, an M9 recognition unit and an interface.

The unit sells for $31,634. Key Tronics can be reached through P.O. Box 14687, Spokane, Wash. 99214.

Microfiche Reader Fits Under Counter

MENOMONEE FALLS, Wis. — Data View, Inc. introduced a "works-under-a-counter" microfiche reader, dubbed the Data View Cube, which it said was developed to streamline the micrographics user's environment.

The cube is designed to be able to drop into a desk teller station or any other workstation where the operator must be an integral part of the system, according to the firm.

The display screen comes in blue, green or gray and is available for under $1,500 from Data View, Inc., P.O. Box 537, Menomonee Falls, Wis. 53051.

Datagraphix Raises Fiche Recorder Cost

SAN DIEGO, Calif. — Datagraphix, Inc. has announced that the price of its standard off-line Autocom microfiche recorder will be increased 12% to $57,500, effective Dec. 1.

The price hike is the result of an increasing emphasis on new software and hardware flexibility by the firm, according to a spokesman.

Minidiskette Bins Hold 50 or 100 Units

NEW YORK — A storage and retrieval bin for minidiskettes has been introduced by Printcraft Systems, Inc.

Available in either a 50- or 100-capacity size, it sells for $22.50 and $25.50 respectively from Printcraft Systems, Inc., 11-17 Beach St., New York, N.Y. 10013.

Eotec Unwraps Line Monitor

SANTA CLARA, Calif. — An additional model of the TT-101 line monitor was announced by the Eotec Corp. here.

The Model II reportedly features technical advances over the previous model such as a 256-char. display with auto or manual modes; a wideband monitoring capability; serial transistor-transistor logic (TTL) interface; a logic recorder with an electronic strip chart display; high-speed operation up to 500Kbytes; auto polling and 801 auto call interface monitoring.

Prices of the basic unit, with all factory-supplied and loaded routines, start at $8,100 from the Eotec Corp., 2595 Martin Ave., Santa Clara, Calif. 95050.

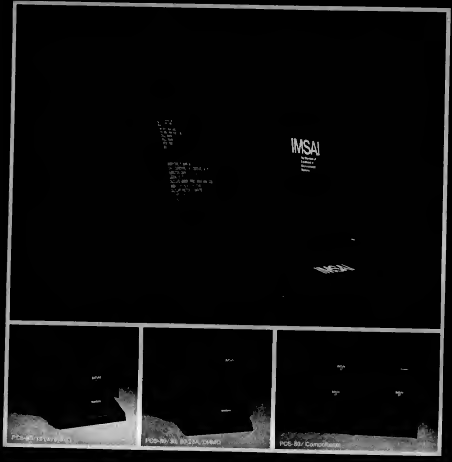
Powering Up

POMONA, Calif. — A switching power supply, designed for high energy consuming equipment, was introduced by Electro-Module, Inc.

The PEX 058-00 is reportedly suited for computer mainframes and peripherals as well as for communication and process control applications. It has an input voltage of 115/230 VAC single phase and a transient response time of .5 msec, the firm said. Its single adjustable output is from 4.75V to 5.25V with current limit and overvoltage protection.

The unit, weighing 36 lbs., is priced at $925 from Electro-Module, Inc., 2855 Metropolitan Place, Pomona, Calif.

the best way to build
your system...



IMSAI introduces
the PCS-80
component system...

Switcher Bows

MIDDLETOWN, N.Y. — Multiple 60- and 415 Hz frequency converters can be switched between any number of IBM 3033, 370/168 and Amdahl Corp. mainframes with a unit that is available from KW Control Systems, Inc., according to the vendor.

The Matrix Switching Unit will allow frequency converters manufactured by different vendors to be incorporated into a large system, the firm claimed.

The output of the switch can reportedly supply 415 Hz power to the mainframes, allowing isolation between them.

The unit costs $12,000 from KW at R.D. No. 4, 114C, S. Plank Road, Middletown, N.Y. 10940.

Compuscan OCR System Uses Smart CRT

TETERBORO, N.J. — An optical character recognition (OCR) system with an intelligent CRT terminal has been introduced by Compuscan, Inc.

The Alphaterm can handle typed and keyed text and/or forms input. It provides output interfaces to paper tape and magnetic tape units as well as phototypesetters and modems.

The system also operates on-line to computers, the firm said.

Control of the system is through the CRT keyboard, which is used for editing, reformatting, displaying errors, entering parameters and displaying I/O on a horizontally split screen.

The software package provided with the initial units will be oriented to telecommunications applications; subsequent units will have software designed for graphics arts and word-processing functions, a spokesman noted.

The Alphaterm system sells for $58,000. Retrofitting to current Alpha and Alphacomm configurations costs $3,000 to $5,000. Compuscan is at 900 Huyler St., Teterboro, N.J. 07608.

TDC 2000 Gains Features

FORT WASHINGTON, Pa. — Honeywell, Inc.'s Process Control Division has enhanced its TDC 2000 process control system.

The enhancements include historical and real-time recording; alarm annunciation and displays; logging; CRT and keyboard interfaces to intelligent multiplexers; digital start/stop operations; and system security.

The latter is a Honeywell development called Uninterrupted Automatic Control (UAC). It automatically detects the malfunction of one to eight basic controllers, notifies the operator, switches in a reserve controller and resumes control of the process in less than 1 sec, Honeywell claimed.

All system additions were designed for use with circuits that plug into existing connectors, making it possible to update installed systems without extensive downtime, according to a division spokesman. The division is at 1100 Virginia Drive, Fort Washington, Pa. 19034.

Distributed DP Topic of Course

NEW YORK — A four-day seminar, dealing with distributed systems will be held here beginning Nov. 28 by the American Management Associations (AMA).

The course will cover the various aspects of processing and storing data at two or more sites, according to a spokesman. It will focus not only on the potential and probable benefits of a distributed system, but also discuss how such systems have changed the role of the manager; the problems of equipment selection, maintenance and implementation; and system security.

The problems involved in planning a distributed system will also be discussed. Such variables as design options, competing product claims and product availability will be covered.

The course was designed for technical management personnel, DP managers, analysts, designers, administrators and others involved with distributed systems.

The November course will be held at AMA headquarters in New York. It will also be given on Jan. 9 in Los Angeles, Jan. 30 again in New York and on March 27 in Chicago.

Registration fees are $490 for AMA members and $565 for nonmembers. With team discounts for three or more people from the same company, the fees are $420 for AMA members and $480 for nonmembers.

AMA headquarters are at 135 W. 50th St., New York, N.Y. 10020.

Contract Course Set

WASHINGTON, D.C. — A three-day course designed to explore the subject of contracting for services with the government will be held here Dec. 14-16 by Federal Publications, Inc.

"Contracting for Services" will initiate the participant into the area of government contract procurement while stressing both practical and legal considerations, according to a spokesman.

Topics covered will include "Foundations of Service Contracting," "Competing for Service Contracts," "Labor Requirements" and "Costs and Prices."

The registration fee is $425. Federal Publications is at Suite 500, 1725 K St. N.W., Washington, D.C. 20006.

is to take it apart piece by piece.

Compare the features of our S-100 bus system, the industry standard, to anyone else. After you've taken them apart piece by piece, you'll know why IMSAI is the system you can grow with. At a price you can live with.

IMSAI 80/30 Integrated Video Computer (with Intelligent Keyboard—IKB-I) Standard Features:

☐ **Price assembled $1499.** IMSAI is the only S-100 bus manufacturer that offers a microprocessor driven keyboard with "N" key roll over, 2¼K of RAM, 8 expansion slots, choice of 4K, 16K, 32K and 64K RAM expansion boards, 3K ROM monitor, synch/asynch serial interfaces, parallel and serial ports, high resolution CRT monitor, 24 x 80 display with graphic editing and data entry features, and 28 amp power supply for the incredibly low price of $1499.

☐ **mpu Speed.** IMSAI is the only S-100 bus manufacturer that offers true 8080 compatibility, operating at 3 mHz.

☐ **RAM Included.** 2¼K.

☐ **Expansion Slots.** Eight expansion slots are provided in a new terminated and regulated motherboard (10 slots total).

☐ **RAM Board Sizes.** IMSAI is the only S-100 bus manufacturer to supply 4K, 16K, 32K, and 64K RAM memory expansion boards.

☐ **ROM Monitor.** IMSAI is the only S-100 bus manufacturer to provide 3K of ROM.

☐ **Asynch/Synch.** Only one other S-100 bus manufacturer provides both methods of data communication.

☐ **PIO/SIO.** IMSAI is the only S-100 bus manufacturer that provides two serial ports and one fully implemented parallel port at no extra charge.

☐ **Video I/O.** IMSAI is the only S-100 bus manufacturer to include a high resolution (14 mHz) monitor as an integrated part of the computer.

☐ **CRT Format.** IMSAI is the only S-100 bus manufacturer to provide a full 24 x 80 screen, which is two times the capacity of the common 16 x 64 screen.

☐ **Graphic/Edit.** IMSAI is the only S-100 bus manufacturer that provides graphics and text editing features with character and line insert/delete for your CRT display.

☐ **Keyboard Included.** IMSAI is the only S-100 bus manufacturer to supply a microprocessor driven keyboard with "N" key roll over and tiered construction for a true typewriter keyboard touch.

☐ **28 amp Power Supply.** The world famous IMSAI power supply assures stability and reliability of performance.

Options: IMSAI is the only S-100 bus manufacturer to provide a comprehensive array of fully integrated options including: line and character printers, CRT terminals, intelligent keyboard, ACR storage, standard and mini floppies, TTY BASIC with OS, 4K, 8K and 12K BASIC, audio cassette BASIC with OS, 8K disk operating system (DOS) based upon CP/M,* scientifically and commercially oriented disc BASIC and level 2 FORTRAN IV compiler.

☐ **Printers.** Only one other S-100 bus manufacturer can supply both line and character printers.

☐ **CRT/Keyboard.** IMSAI is the only S-100 bus manufacturer to provide both CRT terminal and intelligent keyboard as separate options.

☐ **ACR Storage.** Available.

☐ **Floppies.** IMSAI is one of the few S-100 bus manufacturers to provide both standard and mini floppies and the only S-100 bus manufacturer that supplies double density standard floppies.

☐ **TTY BASIC.** IMSAI is one of the few S-100 bus manufacturers that provides self-contained operating systems with 4K, 8K and 12K BASIC.

☐ **ACR BASIC.** IMSAI supports ACR BASIC with an 8K version.

☐ **DOS.** IMSAI is the only S-100 bus manufacturer to provide an enhanced version of the control program monitor (CP/M*) that can support up to 18 disk drives.

☐ **Disc BASIC.** IMSAI is the only S-100 bus manufacturer that provides both scientific and commercial versions of compiler oriented BASIC.

☐ **FORTRAN IV.** IMSAI is the only S-100 bus manufacturer that offers a level 2 FORTRAN IV compiler that operates under an enhanced version of CP/M.*

Prices and specifications subject to change without notice
*CP/M is a trademark of Digital Research Corporation

Price/Performance no one else has put together.

IMSAI®
The Standard of Excellence in Microcomputer Systems

IMSAI Manufacturing Corporation, 14860 Wicks Blvd., San Leandro, CA 94577 (415) 483-2093 TWX 910-366-7287

Donkey Exercises Peripherals, Aids Testing, Repairs

KING OF PRUSSIA, Pa. — A portable, programmable test-and-excercise instrument designed for troubleshooting, repairing and testing computer peripherals has been introduced by Sorbus, Inc.

The I/O Donkey can test and exercise any input, output or communications device, serial or parallel, without tying up a computer or communications line, Sorbus claimed.

Parallel devices are operated to 500 kbyte/sec and serial devices from 50 bit/sec to 19.2 kbit/sec.

The unit was developed for use in a wide range of field services and is effective for disk and tape drives, line and character printers, card readers and punches and CRT terminals, a spokesman said.

Features include selectivity for isolating specific problems, 64 stored programs, manual program edit and entry, parity checking, scratch pad memory, a 1K programmable read-only memory for special data formats and an Ascii ripple generator with 64-, 128-, or 256-char. sets.

The unit, which is RS-232 and TTL-compatible, costs $3,495 from Sorbus at 150 Allendale Road, King of Prussia, Pa. 19406.

Course Aimed at Preparing For Office of the Future

NEW YORK — A course designed to prepare a company for future systems changes and technology will be presented here Dec. 5-7 by the American Management Associations (AMA).

The three-day meeting will discuss how to use management tools to effect the transition to an automated office; how to adapt nonroutine work for automation; and how to analyze workflow requirements in relation to space and technology, according to an AMA spokesman.

"The Automated Office of the Future" will also deal with equipment, mail systems and implementation strategies, he noted:

The seminar costs $425 for AMA members and $490 for nonmembers. Team fees for three or more executives from the same company are $365 per person for AMA members and $420 for nonmembers.

Additional details can be obtained from AMA at 135 W. 50th St., New York, N.Y. 10020.

Catalogs Offered Free to Readers

The following literature is available at no cost to readers:

- A brochure from Optronics International, Inc. details digital image processing instrumentation. The firm can be reached at 7 Stuart Road, Chelmsford, Mass. 01824.
- A catalog describing the Series AB card edge connectors is available from the Sales/Service manager, GTE-Sylvania, Inc., Titusville, Penn. 16354.
- A six-page bulletin on the details of the Gulton Industries, Inc. DM-1050 10-column thermal printhead is available from Gulton at 212 Durham Ave., Metuchen, N.J. 08840.
- CTS Corp. Catalog 3550E describes the firm's Series 550 variable resistors. CTS is located at 6800 County Road 189, P.O. Box 266, W. Liberty, Ohio 43357.
- The HP-19C and HP-29C programmable handheld calculators are described in a brochure from the Hewlett-Packard Co., 1507 Page Mill Road, Palo Alto, Calif. 94304.
- The 1978 catalogue of general instruments has been published by Wiltron Co., 825 E. Middlefield Road, Mountain View, Calif. 94043.
- A line of computer-grade pushbutton switches is detailed in a 16-page brochure from Dialight, 203 Harrison Place, Brooklyn, N.Y. 11237.
- A four-page brochure describing Western Union Data Services' Series 1232 teleprinters is available from that firm at 70 McKee Drive, Mahwah, N.J. 07430.
- A catalog of media filing modules is available from Kwik-File, Customer Service Dept. 2845 Harriet Avenue South, Minneapolis, Minn. 55408.
- A catalog of magnetically shielded floppy disk preservers is available from the Magnetic Shield Division, Perfection Mica Co., 740 N. Thomas Drive, Bensenville, Ill. 60106.
- Tariff, Inc. has a six-page brochure that explains the company's pre-audited, computerized freight payment plan. Contact Tariff, Department B, 53 Main St., Woodbridge, N.J. 07095.
- A 16-page booklet describing the remote computing services available from Calldata Systems, Inc. is available from the firm at 20 Crossways Park North, Woodbury, N.Y. 11714.
- An illustrated 22-page booklet describes how to use opto-isolators effectively, defines technology and shows connecting circuits for use with TTL devices. It is available from Jim Futer at Litronix, 19000 Homestead Road, Cupertino, Calif. 95014.
- Visual Methods, Inc., 5 Wortendyke, Montvale, N.J. 07645, has a brochure that describes some of its access control and visual surveillance systems.

The superb quality of Verbatim™ removable magnetic storage media is now on a dealer's shelf not far from you.

The reason Verbatim is now so accessible is that so many of you like the Verbatim idea: noticeably better quality and durability that show up in tough everyday use. The reason? We make almost everything ourselves, because we found that we could improve on the quality that we were getting from our suppliers.

Being demanding isn't always easy. But it's good for the people who buy and use Verbatim, and it's good for the scores of companies who specify Verbatim for the equipment they make. And we enjoy doing business that way.

Information Terminals Corp., 323 Soquel Way,
Sunnyvale, CA 94086 (408) 245-4400.
TWX: (910) 339-9381.

In the Far East
ITC—Far East
404 Roppongi Skyheights
3-2-21 Roppongi, Minatoku
Tokyo, Japan
Telephone (03) 583-1981
Telex. J 47879

In Europe
Information Terminals S A
Case Postale 296
1215 Genève 15
Switzerland
Telephone (022) 32-32-39
Telex 22647 ITGE CH

Ask for it by name.

Verbatim™

Dear Verbatim people
Tell me where my nearest Verbatim dealer is.

My name is ____________
Title ____________
Department ____________ Tel ____________
Organization ____________
Address ____________
City ____________ State ____________ Zip ____________
And while you're at it, send me literature on ____________

Information Terminals Corp., 323 Soquel Way
Sunnyvale, CA 94086 (408) 245-4400

59-11-14-77

Planning Eases Strained Relations

By Ann Dooley
CW Staff

NEW YORK — The expectations of a first-time user are often not met by a minicomputer vendor — and vice versa, users and vendors agreed at a recent conference here.

But many of the frustrations encountered by both parties during the first-time user's conversion from a manual to an automated system can be avoided if the user gives some thought, planning and commitment to the project, according to Doug Kemp, president of Health Control Corp.

Total commitment to the conversion effort is the top priority, first and always, and that means a commitment by every department, Kemp stated. "If you don't have that commitment, don't do it — wait until you do have it," he urged.

In addition, the total importance of the system to the company must be stressed to all personnel, he said. A real problem can occur because people who haven't been through computerization have a negative attitude about it because it means change for them, he said.

But that change can be eased if the company tries to help its workers adjust, he added.

One thing the user company should do is designate someone with total authority or nothing will get accomplished.

(Continued on Page 66)

DDP: Buzzword Or Byword?

Almost every small business system vendor says it offers it; IBM is eyeing it; the mini makers say they've had it for a while, but they continue to enhance it; the data entry people are merging into it and some enterprising, pioneering users are actually trying it.

What is it? Distributed data processing, otherwise known as DDP.

In February, *Computerworld* will present a special report on DDP, designed to be a forum for users' ideas and experiences in that area.

If you are considering DDP, if you've distributed your processing, if you've sacked your mainframe in favor of multiple minis, or if you just have an opinion on the matter, CW would like to hear your story, and so would your fellow users. Just submit a double-spaced article about four or five pages long by January 15. Address it to Esther Surden, Associate Editor, *Computerworld*, 797 Washington St., Newton, Mass. 02160.

BST Offers 3741 Stand-In

SANTA ANA, Calif. — A device that functionally replaces both the IBM 3741 data entry device and 5471 console printer keyboard unit on the IBM System 3 will reportedly be available from Business Systems Technology, Inc.

The BST/41 Model 2 is an expansion of the firm's BST/41 line, a spokesman said. It has twice the throughput of the IBM unit, plus full system control, Operation Control Language history logging and diskette data preparation functions, the company claimed. BST noted that the unit is compatible with any System 3 configured with the 3741 and 5471 software and that Model 2 diskette units are interchangeable with those used on the IBM 3740 system.

Reading 3,000 records and writing at up to 2,400 record/min, the unit offers the standard IBM 3741 read/write Modes 1 to 5, a direct keyboard entry Mode 0 and a disk copy mode C, BST noted.

Several features of the system differ from those offered by IBM, the company continued. It performs edit and search functions with character insert/delete, cursor control and expanded search capability. In addition, a time-of-day clock is optional, it said.

The unit's keyboard, which BST noted is similar to the one on the 3741, is movable and cabled to the table top enclosure that houses the CRT and diskette unit.

The system will be available in December. It will be rented for $500/mo or leased for $475/mo on a one-year plan, $450/mo on a two-year plan, $425/mo on a three-year plan. Purchase price will be $16,200 from the company at 3015 Daimler St., Santa Ana, Calif. 92705.

Service Bureau Switch Brings Credit Information Control

By Esther Surden
CW Staff

NEW YORK — Borden, Inc. International here is bringing its credit information under control after making the switch from a service bureau to an on-line system running on a minicomputer.

"We recently implemented an on-line real-time credit and accounts receivable system," Nachum Bernard, manager of management information services, explained. The system is running in 98K words of memory in a partition of the mini. It also interfaces with a host of accounting applications.

Borden decided it needed to revise its method of handling credit information in order to shorten the period of time it took to approve or reject credit. Also, the service bureau only produced one output, an aged trial balance, which was insufficient for Borden's needs, Bernard noted.

The current system provides the capability to make an on-line inquiry into a customer's record to approve, reject or withhold credit while a sale is in progress.

The system is broken down into two phases — credit and accounts receivable. Each of the portions has inquiry capabilities and produces a variety of reports. Each runs from 9 a.m. to 5 p.m. daily with reports generated in the evening, he said.

Credit approval, checking and inquiries go through a master selector, he explained. Several passwords and other keys to the system must be used so that unauthorized personnel can not have access to the system. A user can inquire about Dunn and Bradstreet's rating of a particular customer, do a daily inquiry for credit exceptions to determine the status of a customer or find out when the last credit was rejected or approved for that company. "We can also determine which of the accounts are major delinquent accounts and can identify outstanding claims by a customer," he said.

The system is written modularly, Bernard explained. "A tremendous number of modules and programs are involved that are being overlayed, so that all those inquiry capabilities provided by the system are constantly co-resident," he said.

The system provides a reasonable response time of from 1.5 sec to 4 sec in most cases, he added, pointing out that this response time is "quite good" considering the overlays involved and the fact that "the files with which we are dealing are enormously large."

The system runs on a Data General Corp. Eclipse C300 with 92M-byte disk drives as well as communications gear. The terminals used for inquiry are either Hazeltine Corp. or Data General, he said. Programming was done in DG Fortran V, operating under the firm's mapped real-time disk operating system, he continued.

The system interfaces wiht the accounts receivable system so that whenever a credit is issued to a given customer, an accounts receivable record is immediately created and the balance can then be monitored.

It also interfaces to the order entry system, he said. Every time a sale is final, the information for a given customer goes to the banking portion of the order entry system. Whenever a record is put into the banking system, it triggers the accounts receivable file for a given customer in the credit and accounts receivable system, he noted.

When we installed our first minicomputer disk system, we talked a lot about RELIABILITY.

4000 systems later, our customers tell the story.

Reliability We do more than just talk about it We deliver it That's one of the main reasons we're now the world's largest independent supplier of minicomputer disk storage systems

We've delivered more than 4000 systems since we installed our first one in 1971 That's strong evidence of hardware reliability and broad product acceptance.

There's a lot more to the story. Behind our reliable hardware is a reliable company that keeps delivery commitments, provides total software support and responds quickly to customer service requirements Ask our customers.

We make good disk drives work better through *Extended Emulation.*™ This powerful approach adapts software to emulate the CPU manufacturer's operating systems—while still taking full advantage of the unmatched performance offered by our disk system Whether you need disk storage for mini or micro, you need to know about the important benefits *Extended Emulation* can provide

The diverse applications for our disk systems are regularly described in our quarterly newsletter, *The Bit*. If you'd like to be on our complimentary mailing list, use the coupon today We'll send you the current issue And if you need product data, or help with a specific application, contact the System Industries sales/service office nearest you

System Industries
an equal opportunity employer

525 Oakmead Parkway, P.O. Box 9025, Sunnyvale, CA 94086
(408) 732-1650, Telex: 346-459

☐ **Please add my name to your mailing list for *The Bit*.**
Send product data on the follow disk systems:
☐ **2.5 MBytes** ☐ **10 MBytes** ☐ **300 MBytes**
Name ______
Company ______ Position ______
Address ______
City ______ State ______ Zip ______
☐ My need is urgent. Have an applications specialist phone me today: (____) ______ ext. ______

Planning Seen Easing Conversion Frustration

(Continued from Page 65)

Training is an essential part of computerization and time should be set aside specifically for the task of learning, he said.

Kemp also told the audience that decisions should be made as soon as possible and then put in writing to ensure efficiency.

Total commitment, the key to successful computerization, can be displayed by the amount of time set aside for the changeover, Kemp said. The time can be set aside by segmenting a certain amount and assigning someone time to be spent on learning the system.

Another method of converting is to bring in outside people if the present staff is really too busy to put aside any time, he said.

Installing a small business machine is really the same as installing a large processor — it's just a bigger box that costs more hardware dollars, but the procedures are the same, Kemp said.

Once the commitment has been made, customization and design of the system must occur, according to Kemp.

The system shouldn't be designed for the president of the company or the programmer, but for the people who operate it, Kemp said. Their needs should be determined before design begins, he added.

In addition, he pointed out, it's essential to get user input in order to differentiate between what is needed and what is nice to have.

Once input is received, the best working format is selected and an analyst is consulted, the person in charge should make the final decision on his own, Kemp advised.

After the system choice has been made, staffing and training should be the next priority since "people make or break the system."

Decide who's going to work in what area, train them and assign them a specific time for the changeover, Kemp suggested. The manager should also evaluate his staff since some people just don't work well with automation and can't make the change, he warned.

Converting the manual data to the automated system is the most time-consuming part of the process, so good planning is necessary, he said. Operation schedules and procedures should be written, done the same way each time and performed at an assigned period of the day.

A system should be purged regularly, the data stored elsewhere and numerous audit trails implemented since more can go wrong with an automated system than a manual one, he noted.

Philips Gives U.S. Users System Options

WOODBURY, N.Y. — Philips Business Systems, Inc. unveiled two products for U.S. small businesses recently.

Described as fully integrated hardware/software systems, the units were designed for first-time users or those presently replacing accounting machines.

The Model 330, which uses Visual 1 software, includes a 1,920-character CRT with a hard-copy printout capability, front forms-feed handling, a matrix printer and two double-density floppy disk drives.

Program input for the Model 330 is via cassette tapes, a spokesman said, and up to four floppy drives can be accommodated.

The 330 is supplied with software for sales accounting, general ledger, inventory management, accounts receivable and payable and financial statements.

A feature of the system allows the user to continue operating with his current invoices; up to 40 invoices with five product lines and up to 80 invoices with one product line can be printed each hour, the firm said.

A formatter allows the system to conform to the user's invoice, the spokesman added.

The system's nonvolatile core memory is "used as a data dump," the firm said.

The second system introduced was the Model 430, which "has all the capabilities of the 330 plus removable cartridge disks and the ability to be programmed in Cobol and RPG," Philips said.

The Cobol is ANS-compatible and the RPG is similar to that of the IBM 32, the spokesman noted. Users wishing to convert from the IBM 32 to the Philips system would need to go through a program conversion process, he added.

Memory for the larger system is MOS. Minimum memory available is 32K and is expandable in 16K increments with no upper limit placed on the amount the system can accommodate, a spokesman claimed.

Multiple printers, disk drives in 10M-byte capacities and CRTs can be attached to the Model 430, which runs under a disk operating system featuring multiprogramming, spooling, job streaming, and random, sequential and dynamic file access capabilities, the firm noted.

Tuning Available

A typical Model 430 has 32K bytes of memory, a single-screen CRT, a 100 char./sec printer and 10M bytes of disk and costs $33,000.

A Model 330 can range in price from about $25,000 to $30,000. Some minor software tuning is required to fit the applications to the user's shop and the pricing depends on the extent of modification required.

On the average, the tuning would cost about $2,200 the spokesman stated from 173 Froehlich Farm Blvd., Woodbury, N.Y. 11797.

WHEREVER YOU SOFTWARE WIZARDS HAPPEN TO BE, YOU CAN TALK TO DATA GENERAL RIGHT NOW.

Call right now. And talk to key managers in Systems Engineering. They can tell you about Data General from your point of view. Because they're software professionals like yourself. They'll tell you how Data General has managed to become the fastest growing minicomputer company in the world. Growing at the rate of 42% per year. Growing so fast that we now have national opportunities in major U.S. and Canadian cities for Software Support Specialists. Specialists who can provide pre- and post-sale software support on a national basis to the field sales force and to Data General customers. You'll be responsible for proposals and presentations, systems software installations and customer software development.

Your background should include a minimum of 2 years experience in one or more of the following areas: assembly language programming; distributed networks and systems; OS and data base systems development and modification; commercial applications development; experience with DGC equipment using RDOS, AOS or INFOS is a plus.

When you call, you'll hear about the great opportunities, advancements, promotions, competitive starting salary, bonuses, car allowance, tuition and relocation assistance, insurance, challenges and possibilities. All this from the company that's the growth story of the industry. The company that's gone from sales of $1 million to over $254 million in just nine years. And the company that's sold and installed over 44,500 computers in 45 countries around the world. That means you've got to move as fast as we're moving.

Data General

An equal opportunity employer M/F.

If your Software Interests range beyond field software support, ask about our opportunities in software R & D, documentation, technical support, advanced development, etc.

Opportunities exist in the following areas:

Providence, RI
Worcester, MA
Hartford, CT

To apply for one of the above locations, call Julian Garmil, Regional Systems Engineering Manager, collect at (617) 235-8171, or send your resume, including salary history, in confidence to him at Data General Corp., 888 Worcester Rd., Wellesley, MA 02181.

New York City, NY
Long Island, NY
Syracuse, NY
Rochester, NY
Blue Bell, PA
Wayne, NJ

To apply for one of the above locations, call John Kostiw, Regional Systems Engineering Manager, collect at (212) 557-1122, or send your resume, including salary history, in confidence to him at Data General Corp., 144 E. 44th St., New York, NY 10017.

McLean, VA
Richmond, VA

To apply for one of the above locations, call Mark Splaver, Regional Systems Engineering Manager, collect at (703) 893-0910, or send your resume, including salary history, in confidence to him at Data General Corp., 1757 Old Meadow Rd., McLean, VA 22101.

Palo Alto, CA
San Francisco, CA
Denver, CO
Salt Lake City, UT
Seattle, WA
Portland, OR

To apply for one of the above locations, call Jim Raisio, Regional Systems Engineering Manager, collect at (415) 321-6010, or send your resume, including salary history, in confidence to him at Data General Corp., 2445 Faber Pl., Palo Alto, CA 94303.

Van Nuys, CA
Los Angeles, CA
Santa Ana, CA
El Segundo, CA
Anaheim, CA

To apply for one of the above locations, call Al Scura, Regional Systems Engineering Manager, collect at (213) 973-0401, or send your resume, including salary history, in confidence to him at Data General Corp., 2221 Rosecrans Ave., Suite 204, El Segundo, CA 90245.

Milwaukee, WI
Southfield, MI
Ft. Wayne, IN
Omaha, NE
Springfield, IL
St. Louis, MO
Pittsburgh, PA
Cleveland, OH
Madison, WI
Peoria, IL
Wichita, KS

To apply for one of the above locations, call Ron Pipe, Regional Systems Engineering Manager, collect at (312) 885-0505, or send your resume, including salary history, in confidence to him at Data General Corp., 1111 Plaza Dr., Schaumburg, IL 60195.

Birmingham, AL
Dallas, TX
Houston, TX
Atlanta, GA
Charlotte, NC
Knoxville, TN
Orlando, FL
Ft. Lauderdale, FL
Baton Rouge, LA

To apply for one of the above locations, call Brad Hebert, Regional Systems Engineering Manager, collect at (404) 325-3181, or send your resume, including salary history, in confidence to him at Data General Corp., 1639 Tullie Circle, Suite 128, Atlanta, GA 30329.

At $20,000, the Datapoint 1500 would be just another outstanding computer system.

At $5,950 it's almost unbelievable.

Believe. And $5,950 is for a quantity of one. Now you can afford a genuine Datapoint for those applications where computer power was needed but couldn't be cost-justified.

A Real Computer

Don't let the price mislead you. The 1500 contains a powerful fully programmable business computer with 32,000 bytes (8 bits & parity) of memory. Add to that an integral keyboard, video display and dual diskette drives (over 500,000 characters on-line) and you have a complete system. And there's more. A standard, built-in communications interface requires that you add only a modem to start communicating.

With Comprehensive Software

There's much more than just hardware, too. You get a comprehensive Diskette Operating System with a utility library including sort, index and index sequential access method (ISAM), a data entry language (DATAFORM®), a data processing language (DATABUS®). Like all Datapoint systems there's a common, dynamic file structure. No time consuming file format conversion necessary. You start writing application programs immediately.

Easy Concurrent Communications or Printing

The 1500 will communicate in IBM 3780 discipline, or DATAPOLL® for Datapoint-to-Datapoint communications. Auto-answer is standard. You needn't halt an ongoing data entry operation to communicate — with the 1500 you can communicate while an operator continues to enter or process data. Or, you can elect to do concurrent printing on an optional Freedom Printer™.

More Features — And a Growth Path

You'll find the 1500 full of those features you've always wanted. Inverse video for display highlighting, user program defined function keys, simple installation, and easy operator training. Programs can be remotely loaded from a central site. A system that you can adapt to your needs, not the reverse.

Since the 1500 is part of the Datapoint family, you can easily move your application programs to larger Datapoint systems without another investment in software.

Fully Supported

Each 1500 is backed by the nationwide Datapoint Field Service organization with over 90 service centers. And when you need systems or other technical advice, the Datapoint Account Managers and Systems Engineers are ready to help.

Learn More

Call your local Datapoint Sales Office. They'll send you information on how the 1500 can start saving you money now. Or write Datapoint Corporation, Marketing Communications, 9725 Datapoint Drive, San Antonio, Texas 78284.

DATAPOINT CORPORATION

The leader in dispersed data processing™

Home Office: 9725 Datapoint Drive, San Antonio, Texas 78284 (512) 699-7151

Sales Offices: Atlanta/(404) 325-2212 • Boston/(617) 890-0440 • Chicago/(312) 298-1240 • Cincinnati/(513) 481-2600 • Cleveland/(216) 351-1775 • Columbus/(614) 457-1722 • Dallas/(214) 661-5536 • Denver/(303) 321-8286 • Des Moines/(515) 225-9070 • Detroit/(313) 855-2900 • Greensboro/(919) 299-8401 • Honolulu/(808) 833-2110 • Houston/(713) 680-2200 • Indianapolis/(317) 299-4253 • Kansas City/(913) 321-5802 • Los Angeles/(213) 385-0395 • Memphis/(901) 761-3080 • Milwaukee/(414) 453-1425 • Minneapolis/(612) 854-4054 • New Orleans/(504) 522-5457 • Newport Beach/(714) 752-9073 • New York/(212) 971-9270 • Orlando/(305) 896-1940 • Philadelphia/(215) 667-9477 • Phoenix/(602) 265-3909 • Pittsburgh/(412) 344-6800 • Portland/(503) 223-2411 • Richmond/(804) 353-3858 • Rochester, N.Y./(716) 385-3450 • San Antonio/(512) 734-8982 • San Francisco/(415) 398-2888 • Seattle/(206) 455-2044 • Stamford/(203) 359-4175 • St. Louis/(314) 878-6595 • Tulsa/(918) 664-2295 • Union, N.J./(201) 964-8761 • Washington, D.C./(703) 841-7600 • West Hartford/(203) 278-0660 • **Also sales offices in 29 International cities**

Educational Units Packaged

DEC Educational System

MAYNARD, Mass. — Digital Equipment Corp. has packaged some systems especially for educational users. The systems range from entry-level interactive and mark-sense batch systems to a multi-language time-sharing system.

A single-user ES210/C composed of a PDP-11/03 CPU with 56K bytes of MOS memory, dual floppy disk unit, CRT or Decwriter II printer, RT-11 operating system and Basic costs $15,613.

The ES570/W includes a PDP-11/70 with 256K bytes of memory, 176M-byte disk unit, 9-track tape system, 300 line/min printer and Decwriter II console. Software includes the RSTS/-E operating system, Basic Plus-2, Decal (DEC's author language for computer-aided instruction) plus one scientific and one commercial language. This system is priced from $165,060.

Other systems are available from the DEC in Maynard, Mass. 01754.

Cache Buffer Fits PDP-11s

MINNEAPOLIS — Fabri-Tek, Inc. has introduced its Model 920/981 cache buffer enhancement for Digital Equipment Corp. PDP-11 minicomputers.

The Model 920/981, which uses bipolar technology, provides 2K bytes of memory on two printed circuit cards, forming a single plug-in module.

In PDP-11/35 and 11/40 computers, the cache buffer can be used to replace the M981 Unibus Terminator module, Fabri-Tek said.

In PDP-11/34 and other PDP-11 Series processors, it replaces the M920 Unibus Jumper Module.

The Model 920/981 buffers the whole CPU main memory. The module requires no hardware or software modifications, and comes with an on-line/off-line switch capability, the company said.

Cycle/access time is 300 nsec.

The price for a single cache buffer is $4,250, Fabri-Tek said from 5901 S. County Road 18, Minneapolis, Minn. 55436.

System Built on 8080 Type

SANTA ANA, Calif. — A small business system designed around an 8080-type microcomputer is available from Applied Data Communications here.

The Advent 1000 system includes the CPU, an IBM-compatible floppy disk drive and a CRT. It can expand to include up to eight floppy disk drives, 64K of memory, four 10M-byte disk cartridges, eight CRTs, a magnetic tape drive and three printers, the company said.

Capabilities include asynchronous communications at 9,600 bit/sec and synchronous communications at 19.2 kbit/sec.

The system operates under Micro-DOS/Basic, which the vendor said is an amplification of Dartmouth Basic that allows easier writing of programs. The software also includes a file-oriented data base management system and an interactive multiuser operating system.

The Advent 1000 features string handling, string match and variable length strings and string arrays. Sequential, relative and indexed sequential files are also handled, the firm said.

A basic system with 32K bytes of memory, two floppy disks, CRT and a 60 char./sec printer costs $9,500 from the company at 1509 E. McFadden Ave., Santa Ana, Calif. 92706.

Ampex Memory Fits PDP-11

EL SEGUNDO, Calif. — Ampex Corp. has an add-on parity memory that provides 32K to 128K words of memory for any Digital Equipment Corp. PDP-11 system using a Unibus structure.

The ARM-1100P add-on memory was designed to expand memory from any 8K boundary in 32K increments up to the maximum of 128K words. It uses only one CPU slot and requires one Unibus load, Ampex said.

Each ARM-1100P is supplied with wired card rack, power supply, interface, parity control, cooling fans and interconnecting cables, making the memory independent of the CPU with the only interconnection via the Unibus interface, the firm said.

Two-Way Interleaving

The ARM-1100P provides an access time of 375 nsec and a full cycle time of 700 nsec. In addition, two-way interleaving of equal blocks of Ampex and DEC memory is available, the spokesman noted.

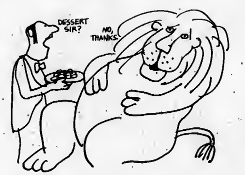
The ARM-1100P add-on memory ranges in price from $4,950 for 32K to $12,750 for 128K. Ampex is located at 200 N. Nash St., El Segundo, Calif. 90245.

Everybody Wins!

with The SYNERGIST™ Business Systems

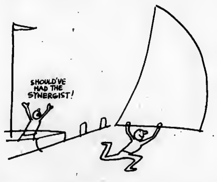
I WIN!
I WIN!
I WIN!
I WIN!

Become a Synergist Dealer. Everybody Wins! With the right system at an affordable price. Whether it's a one user standalone, a 4 to 8 user midi, or a 32 user giant, DCC has it. The Synergist. A comprehensive family of integrated business computer systems.


DESSERT SIR?
NO, THANKS.

A Full Line of mainframes, disc drives, terminals, printers, and workstations — tested to work together. With operating systems, Business Application Libraries, text retrieval systems that scale up without expensive reprogramming. And with plain English requests for on-the-spot management information.

Sell with Confidence. Backed by Data General, one of the largest computer companies. With over 40,000 computers already installed. With software support, dealer training programs and nationwide repair service.


SHOULD'VE HAD THE SYNERGIST!

Don't Ever Lose a Sale Again because your customer needed something larger, smaller, or more flexible. Join the select group of the best managed, business system dealers in the industry. Sell The Synergist. Write or call Ronald S. Harvey, Business Systems Sales Manager, (201) 575-9100.

DIGITAL COMPUTER CONTROLS INC

A Subsidiary of Data General Corporation
12 Industrial Road, Fairfield, New Jersey 07006
Phone: (201) 575-9100/TWX 710 734 4310

NOVA 3* ADD-IN MEMORY.

At 128K x 17, Mostek offers four times more capacity and industry's lowest price.

Mostek's Industry-standard 16K RAM technology makes it possible—a super-dense 128K words × 17 bits on a single card that's completely hardware and software compatible with equivalent Data General* Memory modules and is available in just 45 days.

The MK 8003 series of add-in memory systems has several capacity options. You can choose from 16K, 32K, 64K, or 128K words × 17 bits, on a single board measuring just 15" × 15" × .440.

Board density is just one of the Mostek advantages in Memory Systems. You can also count on value with competitive prices, OEM discounts, and a full one-year warranty on all Memory Systems. Another big advantage is higher system reliability. Mostek memory systems undergo extensive burn-in and testing prior to shipment.

A broad line of memory system products.

In addition to standard add-in memory for other popular mini-computers, Mostek Memory Systems also offers the MK 8000, a 128K × 24 single-card system. It's pin compatible with industry standard core and semiconductor systems. And Mostek's 16K dynamic RAMs make available lower power and greater system reliability.

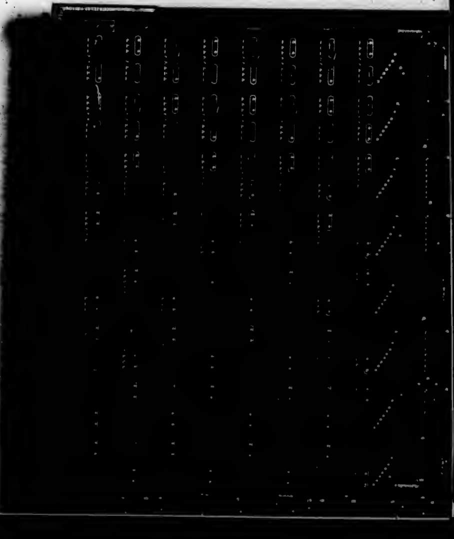
For complete information on Mostek Memory Systems, call Memory Systems Marketing at (214) 242-0444.

Now
Immediately
Available!

MOSTEK Memory Systems

Setting industry standards in reliability.

1215 West Crosby Road/Carrollton, Texas 75006/(214) 242-0444
MOSTEK GmbH/West Germany/Telephone: (0711) 701096



*Trademark of Data General Corporation

CDC Extends Disk Options

MINNEAPOLIS — Control Data Corp.'s 9448 cartridge disk drive was designed for use with minicomputer and small business systems.

The drive transfers data at 9.6M bit/-sec and is interface-compatible with the company's storage module drive and mini module families of disk products. Users can mix the three types of drives on a single controller, the company said.

The 9448 is available in three basic models with storage capacities of 32M-, 64M- or 96M bytes of memory. The module accommodates a 16M-byte front-loading cartridge and up to 80M bytes of fixed disk, CDC said.

Removable Cartridges

Using the drive, data can be copied from fixed disks to removable cartridges for security, a spokesman noted.

Average access time for the disk is 30 msec and average latency is 8.33 msec at a 3,600 rev/min rotational speed, he said. Each recording surface includes 384 track/in. and data is recorded at densities of 6,038 bit/in.

CDC 9448 Drive

The 9448 drive includes microprocessor-based control logic and is available in a cabinet or in a rack-mountable version. It costs $3,900 for the 32M-byte model, $4,950 for the 64M-byte unit and $6,000 for the 96M-byte module.

The removable cartridge costs $205. It will be available in the second quarter of 1978 from CDC, Box O, Minneapolis, Minn. 55440.

Help for 3/10

KING OF PRUSSIA, Pa. — Sorbus, Inc. has inaugurated a maintenance service program designed to meet the needs of IBM users.

The maintenance service plan includes both preventive and remedial maintenance for all standard components of an IBM 3/10 including CPU, peripherals and associated communications equipment, Sorbus said.

23 Service Areas

The plan is now available in 23 service areas including Atlanta, Baltimore, Charlotte, N.C.; Chicago, Detroit, Houston, Kansas City, Kan.; and Los Angeles.

Sorbus is located at 150 Allendale Road, King of Prussia, Pa. 19406.

Continental Has Line Printers

BEDFORD, Mass. — A series of medium- and high-speed line printers has been introduced by Continental Resources, Inc.

The series includes the CP-300, which can print 160- to 300 line/min, the CP-600, which runs at 330- to 600 line/min; and the CP-1000, which handles 580-1,200 line/min.

Each features chain technology and full print line buffering, the firm said. The series is compatible with Digital Equipment Corp.'s PDP-11 minicomputers.

The cost of the CP-300, CP-600 and CP-1000 printers is $12,500, $15,500 and $17,500 respectively, Continental said from 175 Middlesex Tnpk., Bedford, Mass. 01730.

HP Unit Gathers Obstetrical Data

WALTHAM, Mass. —. Hewlett-Packard Co. has a mini-based obstetrical data system that, when linked to bedside HP 8030 series cardiotocographs, simultaneously gathers fetal heart rate and uterine activity data.

The heart of the system is the high-speed, large-memory HP 9825A desk-top computer, which features an integral printer and uses magnetic tape cassettes for data and program storage and retrieval, a spokesman said.

The basic obstetrical data system costs $17,000 from HP's Medical Products Group, 175 Wyman St., Waltham, Mass. 02154.

PRICE IS RIGHT

LIB/OL and SPM cost about the same.

SWITCH NOW!

SEE PAGE 3.

THE WORLD'S A SOMEWHAT LESS

In the spring of 1962, Dataproducts began building printers.

And a reputation.

Today, we design and build printers (in the United States and Europe) for OEM's and their end-users the world over.

We are dedicated to producing the finest printers money can buy.

We will never copy.

We will never offer you a printer whose only virtue is low price.

We will never compromise with quality.

And neither should you.

Everything from 80 CPS to 2000 LPM

We have a printer for every purpose.

We make fast printers and slow ones; big printers and little ones.

We make printers for high-volume EDP, for small business systems, for message terminals, and machine readable applications.

We make impact and nonimpact printers;

T-80 THERMAL PRINTER—80 CPS

B-180 BAND PRINTER—180 LPM

M-200 MATRIX PRINTER—200 LPM

2290 LINE PRINTER—900 LPM

2470 LINE PRINTER—1250-[illegible]

2560 CHARABAND [illegible]
[illegible]-2000 LPM

Small System Treats Pharmacy's Cash Flow Ills

By a CW Staff Writer

DES MOINES, Iowa — A small business system at a pharmacy here has been the prescription for the firm's cash flow problems, according to Ron Secrest, partner in Sun Park Fair.

The pharmacy had been experiencing rapid growth. "Probably 50% of our business is done with insurance companies that insure a whole group of people," Secrest explained. Filling out the forms took a great deal of time and that tied up the cash flow. "Now we can fill in and send in the forms every day," cutting turnaround time by some 30 days, he noted.

"Our business expanded to the point that we knew we needed to hire more people, while we also needed a more sophisticated recordkeeping method," he said. This pointed to computers as a solution. So the company began looking for some way to accomplish its goals. First it looked at three or four companies that would put a terminal on-line to a large computer at a wholesale pharmacy outlet, but "we liked the idea of having the system in-house and being able to tailor it to our needs," Secrest said.

The company looked around but couldn't find a small system that had a pharmacy application at that time, he noted. Olivetti Corp. of America, however, was willing to work on writing one with the company, so it installed an A5 accounting system.

The system "sits right where we used to have typewriters," Secrest said. Because of Iowa laws requiring that all prescription labeling must be handled directly by a registered pharmacist, the pharmacists do all the data input themselves. Insurance forms, however, can be prepared with help from clerks, he added.

Follows Rules

"There are a lot of federal as well as state rules that have to be met when filling prescriptions," the pharmacist noted. For example, the pharmacy must keep a record of each prescription including for whom it was filled and other pertinent information. These records must be posted in a journal so that inspectors can examine them. The system keeps track of the prescriptions filled each day and at the end of the day produces a summary report for the journal, Secrest noted.

Each prescription must also be labeled. Formerly a manual procedure, the labeling application is now automated so that if the pharmacist is filling a prescription for the second time, he need only insert a magnetic card into the system. Thus, any prescription is just typed once.

The system also produces a "neatly typed receipt," which is somewhat of a novelty in the pharmacy business, he indicated. Many receipts are unacceptable to insurance companies, while this one is detailed enough for their needs.

ITI Schedules Winter Courses

McLEAN, Va. — Three courses on minicomputers and distributed data processing will be offered by Innovative Technology, Inc. (ITI).

A four-session course for managers who "require an overview of the latest computer hardware and software technology" will be given on Tuesday evenings beginning Nov. 15 from 7 p.m. to 9:30 p.m. at the company's headquarters here.

A repeat performance beginning March 7 will be given every Tuesday and Thursday evening during the same hours.

A six-session course to provide DP managers with an efficiency checklist for their systems and to identify the techniques and hardware available to the managers will be offered Jan. 1-26 on Tuesday and Thursday evenings.

An eight-session course for system analysts and programmers will be taught on Wednesday evenings beginning Feb. 8.

The four-session course costs $300, a six-session course costs $400 and an eight-session course costs $500. Information is available from the company at 1651 Old Meadow Road, McLean, Va. 22101.

FINEST PRINTERS: THAN HUMBLE AD.

we make matrix and full character printers; and we make them for commercial as well as military systems.

We have what you need.

Our printers work and work and work

The computer industry is crowded with printer companies.

But only one dotes on dependability.

Only one consistently comes up with innovations like the Mark IV and Mark V friction-free hammers, the 14-wire dual-column matrix head, the unique self-cooling thermal print head, the Charaband horizontal font carrier, and many more.

And only one is the largest independent printer company in the world.

Dataproducts is the one.

We're not just a printer company.

We're *the* printer company.

And we're setting the stage for a whole New Era in printers.

B-300 BAND PRINTER—300 LPM

2230 LINE PRINTER—300 LPM

2260 LINE PRINTER—600 LPM

TEMPEST LINE PRINTERS— 300, 600, & 900 LPM

A NEW ERA

Dataproducts

THE PRINTER COMPANY

6219 DE SOTO AVE., WOODLAND HILLS,
CA. 91365, TEL: (213) 887-8451
DARMSTAEDTER LANDSTRASSE 199,
FRANKFURT, W. GERMANY, TEL: 681-034

CERTIFICATE IN DATA PROCESSING EXAMINATION

A comprehensive guide and review for those seeking job advancement and improved performance by scoring high on the CDP Examination

USE THIS STUDY GUIDE IN PREPARING FOR THE FEBRUARY, 1978 CDP EXAMINATION

900 Practical Questions... With Answers...: Complete Coverage of All Subject Areas... Closely Simulates The Actual CDP EXAMINATION

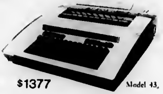
650 pages $12.00

Send $12.00 (plus 50¢ for postage and shipping) to: ARCO PUBLISHING CO. Dept. CW 219 Park Ave. So. New York, N.Y. 10003

ECONOMY and POWER

ADM-3A

$830



$1377

Model 43

- *Display: 24 Lines, 1920 Characters*
- *Addressable Cursor*
- *Keyboard may be cleared remotely*
- *Ma Bell Compatible*

- *110 — 30 cps, 132 CHARACTERS*
- *Upper — Lower Case*
- *RS232C Compatible*
- *9 x 6 Dot Matrix*
- *Height 5½", Width 18", Depth 21½", Weight 30 lb.*

Sales — Service — Rentals

For further information call John Storm

TERMINAL SYSTEMS INC
[illegible] HARTLAND STREET NORTH HOLLYWOOD CALIFORNIA [illegible]
213 [illegible] Toll Free outside of California 800 [illegible]

For All your Mini Computer and Tele-Communication Needs

Redundant Minis Viewed Path to Fault-Tolerant DP

By Esther Surden
CW Staff

SEATTLE — Using minicomputers for fault-tolerant computing is becoming more important as these small systems are increasingly being used in life support applications in hospitals or for vital maneuvers in the space program, according to Richard J. Spillman, a doctoral student in electrical engineering at Utah State University.

Delivering a paper entitled "A Fail-Safe Redundant Architecture for Fault Tolerant Computing" at a recent conference here, Spillman noted that redundancy is the most common method of obtaining fault tolerance.

A technique often used is the triple module method, in which three copies of a module perform the same function. A separate voter module selects the majority output in a case of a failure, Spillman explained.

Another method of obtaining fault tolerance is the hybrid method, which uses an elaborate system of switches and spares. The switching system has the task of swapping out a bad module and replacing it with a good spare.

Both of these systems have disadvantages, Spillman noted. If two of the modules using the triple module technique go bad, the voter selects bad output because it must select the majority output. In addition, the voter itself is subject to failure.

Systems using the hybrid method have problems with complicated switching circuits and spare parts that run out, he added.

Fail-Safe Systems

Fail-safe systems use an entirely different technique of fault tolerance. These systems are designed to fail in such a way that the least amount of damage will take place.

For example, in a traffic system, all the lights will fail by turning red, not green, because it is safer for the cars to stop. In a medical situation, such a system would notify the doctor or nurse when it failed so the patient would not be left unsupported.

Describing a method that combines fail-safe techniques with triple module redundancy, Spillman presented a system model in which each module is made fail-safe so that if it fails, it produces an output upon which the gate will not act.

The voter then becomes a very simple switching device, not often subject to failure, which will only let outputs other than the inaccurate one pass.

Some advantages to this method include the use of a simpler gate which is less likely to fail. Also, no restrictions are placed on the number of modules that can be used.

Some disadvantages can be associated with this method, he admitted. For example, fail-safe design requires some extra gates within the modules which slightly increases the probability of failure.

In addition, multiple faults can go undetected, producing an unsafe fail. Scientists are working on the problem.

Techtran Adds Disk Recorder

ROCHESTER, N.Y. — A microdisk recorder that is compatible with Digital Equipment Corp., Intel Corp. and RCA disk systems has been introduced by Techtran Industries, Inc.

Diskettes recorded on the Techtran 9512 via an RS-232 terminal or data logger can now be read on these minicomputer disk systems. Also, diskettes generated on-line from DEC, RCA or Intel systems can be read off-line back to an Ascii terminal or to a remote location.

Standard features reportedly include random access by character string and bidirectional skip. The unit sells for $2,595 from Techtran at 200 Commerce Drive, Rochester, N.Y. 14623.

DataComm 78
Conference
& Exposition
Washington, D.C.
Feb. 21-23, 1978

The ONLY National Industry Show Scheduled For An East Coast City In 1978

Extraordinary buying power will be represented at DataComm 78 because of its prime location, Washington, D.C. The Conference and Exposition takes place in the heart of the concentrated computer population in the Northeast and Northcentral parts of the country.

Almost 40% of the total installed value of general-purpose computer systems in the entire U.S. is within a 400 mile radius of DataComm 78. . .Sites within that area account for approximately 1/3 of all U.S. data processing expenditures. Users in this key geographic area find DataComm not only essential to attend, but also within easy reach.

DataComm's 1978 Conference Program is nearing completion with well over 100 speakers, more than 1/2 representing vendor companies. . .all the way from AT&T to Xerox. That's good company. . .it means business! For them and for you.

The expanded program for this year's DataComm, coupled with the show's traditional appeal to all levels of interest in the data communications marketplace, is designed to attract an even greater number of attendees than in the past.

Excellent booth locations are still available. . .to reserve your space NOW, return this coupon immediately.

DataComm 78
Conference
& Exposition
Washington, D.C.
Feb. 21-23, 1978

To: CONFERENCE CHAIRMAN
DataComm 78
60 Austin Street
Newton, MA 02160

Here's what I want from DataComm 78:

☐ All the Logistics: price, floor plan, reservation agreement
☐ To talk to a DataComm representative
☐ The monthly newsletter, "DataComments"

Name ______
Title ______
Company ______
Address ______
City ______
State ______ Zip ______
Telephone ______

TDL Offering Fortran IV For Micros

PRINCETON, N.J. — The "first complete" Ansi-standard Fortran IV designed and written for a microcomputer has been introduced by Technical Design Labs, Inc. (TDL).

This Fortran IV is equipped with extensions that reportedly exceed the usual Ansi standard requirements. The package includes a full type conversion, a full library of scientific and string functions, a linking loader with an automatic library search, fully formatted I/O, sequential and direct access I/O and hex constants, the firm said.

The complete package, which runs with less than 24 K and includes the floppy diskette with object code and a user's manual, costs $349 from Technical Design Labs, Inc., Research Park, Building H, 1101 State Road, Princeton, N.J. 08540.

Publishers, Stores Abound

First Midwest Show Has Local Flavor

By Frank Vaughan
CW Staff

CHICAGO — Over 12,000 visitors poured into the "world's largest" Holiday Inn here to see 84 booths and more than 60 exhibitors at the '77 Midwest Personal Computing Show.

The show had a slightly different flavor from most of the microcomputing shows this year. The manufacturers did not dominate the exhibit space; instead, publishers, stores and dealers were in great abundance.

Of the major vendors who did exhibit, Commodore's Pet was probably the most sought-after exhibit, with the exhibitors immediately surrounding the double booth benefiting from the overflow.

Tandy Computers (Radio Shack) also drew a great deal of interest from the visitors, as it has at the past few shows, partly because it offers one of the more visible microcomputing systems in the noncomputer retail area.

Digital Equipment Corp., which also participated in New York's Personal Computing Exposition, was one of the more unusual exhibitors. Although the minicomputer firm brought no hardware to either show, limiting its sales to cases upon cases of books, it also did some personnel recruitment.

"I personally know of no plans that DEC has to enter the hobby area, but then I don't know everything that DEC does," one of the recruiters said. DEC's purpose in attending hobby shows is twofold, the exhibitor noted. First, hobbyists look for a lot of the manuals and documentation that DEC has published for its minicomputer lines, especially in the PDP-8 area. Second, the hobbyist makes a very attractive employment candidate.

Largest Display

Mits had the largest display on the show floor, taking six booths on the end of an aisle. The firm only used four of the six booths to give an island effect, which drew hobbyists from all directions. The booth also was staffed by employees of some of the local Mits/Altair stores, in keeping with the local flavor of the show.

Among the publishers present, Creative Computing, People's Computer Co., Personal Computing (show sponsors) Matrix Publishers/Dilithium Press, Hayden Books and Kilobaud provided a variety of reading material for the hobbyist.

Creative Computing magazine's booth contained its usual assortment of magazines, books and catalogs — along with some of the not-so-usual items such as binary dice and the firm's "Computer Rage" game. Personal Computing sold mostly back issues while Kilobaud's Wayne Green drew large crowds of both hobbyists and Ham radio enthusiasts who were interested in picking up books, magazines, back issues and a chance to win a trip to the Caribbean. Hayden and Dilithium (named after the types of crystal needed to power the warp drive on television's Starship Enterprise) both sought out the hobbyist-store owner trade for book sales.

Among the dealers offering mail-order catalogs were the Byte Shop/Micro Age stores and the Itty Bitty Machine Co., Inc. who ask that people spell out the company name fully because "we don't want to be confused with any other computer company selling hardware under our initials."

Educationwise, the show offered both free and paid seminars for the visitors. Among the free seminars was "Math Packages for Small Business Applications" by Gerald Koppel of the AAA Chicago Computer Center; "Introduction to Computer Hardware;; by Arthur Kingsnorth of E&L Instruments; "Computer Music for the Hobbyist" by Malcolm Wright of Solid State Music as well as several others.

Seminars which users had to pay for included a series on microprocessors by Rodney Zaks of Sybex and a "computer school" by Gene Morrow of Compoter Power and Light.

In New York City

Show Introduces Uninitiated to Micros

By Frank Vaughan
CW Staff

NEW YORK — Every time one of the elevator doors opened, another mob piled into the already crowded floor of the Personal Computing Exposition at the Coliseum here. By the end of the three-day show, over 13,000 people had managed to crowd onto the floor, many of them apparent newcomers to the field.

The show here was large, with wide aisles, 142 booths and 94 exhibitors. Many of the major manufacturers were present, as were most of the firms' product lines, either through manufacturers' or dealers' booths.

The crowd at the show was different from that of most microcomputing shows, with the $5 admission fee attracting many people who otherwise might not have attended. Many of the dealers were made acutely aware of the large number of uninitiated visitors when they found themselves answering fundamental "what-is-a-microprocessor?'-type questions.

In a sense, the show here was the first chance for the public to actually see microcomputers — and the results were favorable, if the number of bundles, bags and boxes being carried out the doors was any indication of total sales.

Even the local entrepreneurs were out in strength. One youth walked the show floor in search of a customer to buy a slightly used calculator. And the ever-present Coliseum hot dog (all beef, only $1.35) sustained many of the vendors for the three days of the show.

Free seminars encompassed such subjects as "Applications of Home Computers: The Myth and the Reality"; Microcomputers in Education"; "How to Build Personal Computer Kits"; and the general subjects of speech analysis, music, getting started and music synthesis. Speakers during the show ran the gamut from publishers (David Ahl, of *Creative Computing*, Robert Jones of *Interface Age* and Carl Helmers of *Byte*) to store owners (Dr. Portia Isaacson of the Micro Store) to scientists (David Fylstral of SRI International).

A series of special programming sessions was also run with such topics as: an introduction to Warnier-Orr structured programming; the SMAL/ST compiler; teaching calculators tricks; basic Basic; proving that a program is correct; and a high-level assembly language for micros.

Rounding out the educational opportunities at the show was a series of tutorials by the Institute of Electrical and Electronics Engineers (IEEE) Computer Society. Six day-long tutorials were held, three at the basic level and three at the intermediate/advanced level.

One of the more unusual exhibits came under the title of Microcomputers for the Handicapped, an organization that was formed at Personal Computing '77 in Atlantic City under the leadership of Dr. Robert Suding, research director of The Digital Group. The group is interested in using microcomputers to assist the handicapped in the daily routines.

Book 'Debugs' Debugging

DERBY, Conn. — A paperback book that describes a method of entering, debugging and storing assembly language programs is available from E&L Instruments, Inc.

DBUG: An 8080 Interpretive Debugger, by Christopher A. and Jonathan A. Titus, instructs the user on how to enter a program into an 8080 microcomputer memory and single-step it through, instruction by instruction.

Dbug resides in a 1K-byte block of memory and I/O routines can accommodate magnetic tape cassettes, CRT terminals or paper tapes.

The book, including a bootstrap loader, two listings (one in octal code and the other in hexadecimal) and examples of applications costs $5 from E&L Instruments, Inc., Derby, Conn. 06418.

batch processing — 1. In computer terminology, batch processing refers to a specific method of processing in which a number of similar input items are grouped for processing during the same machine run. 2. Batch processing computer systems generally do not require immediate updating of files. In batch processing, data is gathered up to a cutoff time and then processed.

baud rate — A type of measurement of data flow in which the number of signal elements per second is based on the duration of the shortest element: When each element carries one bit, the baud rate is numerically equal to bits per second (bit/sec).

benchmark — In relation to microprocessors, the benchmark is a test point measuring the performance characteristics of products offered. A benchmark program is a routine or program selected to define or compare different brands of microprocessors. A flow chart in assembly language is often written out for each microprocessor, and the execution of the benchmark time, accuracy, etc. is evaluated.

bidirectional — Generally refers to interface ports or bus lines that can be used to transfer data in either direction, e.g., to or from the microprocessor.

binary code — A code in which every code element is one of two distinct types of values. For example, the presence or absence of a pulse.

binary coded decimal (BCD) — A system of number representation; that is, an information code in which each decimal digit is represented by four binary digits.

binary dump program — — A program that provides a means for printing displaying or punching a binary tape copy of any portion of memory. The output may be selected as either absolute or binary relocatable.

binary loader — This is used to load a binary format such as those produced by the binary dump program, the link editor or an assembler into memory.

biopolar (unipolar) — When a logical "true" input possibly is represented by an electrical voltage polarity opposite to that representing a logical "false" input, the signal is defined as bipolar. If both "true" and "false" inputs are represented by the same electrical voltage polarity, the signal is defined as unipolar.

black box — A generic term which can describe any unspecified device performing a special function where the inputs produce specific outputs.

LEARNER'S LEXICON

From Microcomputer Dictionary & Guide by C. J. Sippl and D. A. Kidd. Used with permission of Matrix Publishers, Inc., 207 Kenyon Road, Champagne, Ill. 61820.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

MICROCOMPUTING CLASSIFIED EXCHANGE

This special classified section in solid (non-display) format is designed for people who are working with or interested in microcomputing. Through it, you can buy, sell or swap equipment software or services; contact people with similar interests; start clubs; disseminate information; look for game partners; or send messages to other individuals. As the number of ads increases, this section becomes more useful; so we've tried to make ad placement as simple and inexpensive as possible. Details are as follows:

Ordering: The attached form will serve as the simplest way, we feel, to place your ads in Microcomputing Exchange. Please do not use it for other classified sections of Computerworld. They are display format and have different procedures and rates. Publisher reserves the right to refuse ads for this section, to limit the size of ads placed, and to limit the number of ads placed by any one person or company

Payment: Must accompany your order. No exceptions. Your check will be accepted.

Copy and Closings: Deadline for copy to be in our hands is Friday, ten days preceding Monday issue. All copy must be submitted in writing (no copy taken over the phone), clearly typed or printed. We cannot be responsible for errors in printing made from illegible copy.

Rates: 80¢ per word. All words set in same size and typeface, up to first five words may be boldface. In making word counts, include name and address. Name of city (New York) or state (New Jersey) counts as two words. Zip code or phone number (including area code) counts as one word. (Publisher reserves right to omit zip code and/or abbreviate words if space is tight.) Count each abbreviation, initial, single figure or group of figures or letters as a word. Symbols such as RAM, CRT, etc. count as one word. Hyphenated words count as two words. No commissions paid to agencies.

Box Numbers: Are available at $5.00 per insertion. Send replies to box numbers to:
Box XXXX
Microcomputing Exchange
Computerworld
797 Washington Street
Newton, MA 02160

Order Form

TO: Microcomputing Exchange
Computerworld
797 Washington Street
Newton, MA 02160

I have read the rules, and would like to place my ad as follows.

Date of first appearance (or "next available issue") ____________

Number of weeks ad is to run: ____________

Box number desired (add $5.00) ____________

COPY: (Attach copy on typed or printed page if you wish. Please be legible. Circle up to first five words for boldface.) ____________

____

____

____

____

____

____

Total words @ 80¢ each equals ________
Plus Box Charge (if any) ________
Equals total cost per insertion ________
Times total number of insertions ________
Equals total enclosed ________

Name ____________

Signature ____________

Address ____________

City ____________ State ____________ Zip ____________

Phone where you can be reached during day ( ) ____________

RCA Microtutor II Gives Programming Experience

SOMERVILLE, N.J. — A microcomputer system designed for hands-on operating and programming experience has been announced by RCA.

The Cosmac Microtutor II is preassembled and contains its own regulated power supply, the firm said. The unit provides input via eight binary toggle switches and output on two seven-segment light-emitting diode (LED) hexadecimal digit displays.

Microtutor II is supplied with 256 bytes of complimentary MOS random-access memory (RAM) on a card that attaches to the base through a standard 44-pin connector, a spokesman noted. An additional prewired socket and connectors are provided for system expansion.

More RAM and user I/O interfaces can be connected to this socket and an operating system can be loaded to provide a utility memory, the spokesman added.

The unit has a crystal clock for stabilized timing applications and a memory protect switch which prevents the memory write operation from writing to itself.

The Microtutor II, which operates from a 115V 50/60 Hz power line, is priced at $195 from RCA, Box 3200, Somerville, N.J. 08876.

I/O Board Options Grow

NORWOOD, Mass. — Analog Devices, Inc. has expanded its analog input/output subsystem product line to include data acquisition and analog ouput boards that are said to be compatible with Texas Instruments, Inc., Pro-Log, Intel Corp., Motorola, Inc. and National Semiconductor Corp. microcomputers.

For the Pro-Log 4- and 8-bit microcomputers, Analog-Devices introduced RTI-1220, a 16-channel data board priced at $269, and the RTI-1221, a 4-channel analog output board priced at $235 for 8-bit accuracy and $275 for 10-bit accuracy.

For the Intel SBC80 and MDS and the National Semi BLC80, there RTI-1201, a 12-bit analog output board priced at about $375 and the RTI-1202, a 16-channel, 12-bit board that costs approximately $400.

For the Motorola MM6800, Analog Devices announced the RTI-1230, a 16-channel, high-speed analog input board priced at about $450; the RTI-1232, a 4-channel analog output board priced at approximately $425; and the RTI-1231, a complete 16-channel analog input/output subsystem that costs about $500.

Analog Devices is at Rt. 1 Industrial Park, P.O. Box 280, Norwood, Mass. 02062.

Introductory Course Slated

DELRAN, N.J. — A three-day introduction to microprocessors that will examine hardware and software, provide design experience and look at future trends and developments will be offered by Datapro Research Corp., beginning Dec. 7 in San Francisco.

Designed for people who are active in or contemplating the use of microprocessor technology, the course will consist of an introduction and definition of micro systems, explanation of interface design, and a workshop on interface usage.

Registration fees are $425 for Datapro subscribers and $475 for nonsubscribers. Additional information can be obtained from Datapro Research at 1805 Underwood Blvd., Delran, N.J. 08075.

Periodical Guide Available

ALOHA, Ore. — A guide that indexes 1,080 articles from 23 hobby and professional computer publications and contains editorials, book reviews and letters from readers which relate to the personal computing field is available from E. Berg Publications.

The *Periodical Guide for Computerists* is available for $3.00 from the publisher at 1360 S.W. 199th Ct., Aloha, Ore. 97005.

Micropolis Offers Floppy

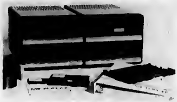
CANOGA PARK, Calif. — A 5-1/4-in. floppy disk system offering over 1M bytes of storage has been announced by the Micropolis Corp.

The Metafloppy 1054 Model II is made up of four drives in a dual/dual configuration, a controller, power supply, chassis, enclosure, cabling and a Basic software package. It will plug into any microcomputer using an S-100 bus and stores over 1.2 million 8-bit bytes in each unit, Micropolis said.

The drives feature an all-steel head positioner system and a referencing technique that minimizes the effect of any outside distortion.

Track-to-track access time is approximately 30 msec with data transfer rates up to 250 Kbyte/sec.

The Metafloppy 1054 costs $3,220 from Micropolis at 7959 Deering Ave., Canoga Park, Calif. 91304.



The Metafloppy 1054 provides over 1.2 million bytes of on-line storage.

MICROCOMPUTER ADS

Where to find bargains,
buyers, programs,
peripherals or personals.

8080 MULTI-TASKING DOS AVAILABLE. Fast, real-time operating system. Multi-sessioning, multi-user DOS supports 20+ terminals. Features dynamic memory allocation, 35 system functions with line and block editors, system log, user accounting and password protection. Assembler/linkage editor support program development. Also have multi-user BASIC compiler producing reentrant code. MVT MICROCOMPUTER SYSTEMS, INC., 21822 Sharman Way, Canoga Park, CA 91303, (213) 348-2030.

SYSTEMS AND APPLICATIONS SOFTWARE WANTED. Business and industrial Applications (any Basic) Communications Protocols, Systems Software (8080 Assembler or PL/M). Please state description and asking prices. Computer Concepts, 148 West 77th St., N.Y., N.Y. 10024.

MICRODATA REALITY CORE memory. 8K and 16K modules. Manufactured and serviced by Microdata. Jack Hardman (201) 751-3000.

OPPORTUNITY FOR BUSINESS MICROCOMPUTER DEALERSHIPS. Californie Microcomputer Company's (CMC) previous ads in Computerworld has resulted in several established dealerships. If you are interested in a CMC Dealership for a small business microcomputer system that includes CPA approved business software, call or write us. 1 year free software releases to customers. Complete leasing and maintenance plan available to dealers. California Microcomputer Company, P.O. Box 3199, Chico, CA 95927, (916) 891-1420.

What's Wrong With This Picture?

ADL
ENTERPRISES, INC.
410 Route 15 South
Wharton, New Jersey 07885
201-328-1300

Chances are, you're not used to seeing a foreign CRT in an IBM environment.

Look again.

The ADL 3052 is designed to be right at home in your EDP. Without software modifications. With 80 per cent less console time. Instant CPU requirement display. Slave ports.

I'd like to bring my EDP into focus. Please send complete information on the ADL 3052

Name ______________________
Company ______________________
Street ______________________
City ______________ State ____ Zip ____
Phone ______________ Ext ______

HAVE WE GOT A LINE PRINTER FOR YOU.

If you've got a Burroughs, DEC or HP system.

BDS sells Dataproducts printers far below the prices charged by Burroughs, DEC or HP for the very same printer sold under their name. We interface to the mainframes of these big three and numerous others. Each of our printers comes complete with appropriate controller and cable; ready to plug in and start printing.

BDS carries a large inventory of new, not reconditioned, Dataproducts printer models. In fact, we are the worlds largest supplier to the end user. Printers, and only printers, are our business. We deliver promptly and we provide service in more than 50 U.S. cities, coast to coast.

So if you want to buy one printer or, if you're a systems house, a "dozen" printers; contact BDS for attractive unit prices or quantity prices covering the complete line of Dataproducts' printers.

Featured in the Dataproducts list of line printers sold under the BDS name.

☐ The 2200 Series—gives significantly low operating cost at 300, 600, and 900 LPM.

☐ The 2550 Charaband—sets a new standard in horizontal font printers at 1200-1500 LPM.

☐ The 2470 Heavy Duty Drum—offers real price performance advantage at 1500-1800 LPM.

If you're interested in saving 30 to 50% of printer costs fill out and mail the coupon.

Speed (LPM)	Dataproducts Model No.	BDS Prices		
		DEC	HP	Burroughs
300	2230	$ 8,595	$ 8,595	$14,000
600	2260	11,595	11,595	18,000
900	2290	14,495	15,700	25,000
1200-1500	2550	24,995	27,000	32,000*
1500-1800	2470	26,995	29,500	32,000*

Prices include appropriate controller and cables
Printer ready to connect and operate.

*Burroughs Standard printer price, add $3,500 for DLP option.

Yes, I want to save 30 to 50% of printer costs.

The computer system I use ______________

My line printer requirements are ______________

Name ______________
Title ______________
Company ______________
Street ______________
City ______________ Zip ______________
State ______________
Telephone ______________

BDS Computer Corporation, 1149 Chestnut St.
Menlo Park, CA 94025, (415) 326-2115

BDS Computer Corporation, 1149 Chestnut Street
Menlo Park, CA 94025, (415) 326-2115

IBM's Good Equal to Nation's: Memo

By Catherine Arnst
CW Staff

NEW YORK — "What's good for IBM is good for the country" was apparently the position taken within IBM during the mid- to late-1960s, according to documents released as part of the U.S. vs IBM antitrust trial.

The documents, which equate "national interest" with the firm's "financial interest", are part of a group of documents IBM has been fighting to keep from public view since the case began almost nine years ago [CW, Nov. 7].

The documents show that IBM used the criterion of "national interest" to justify preannouncing products and technologies not yet available in the marketplace.

However, there was a disagreement internally as to how to define "national interest" so that preannouncements could be made, since preannouncing was supposedly against company policy.

The issue has arisen in the trial because the government contends that IBM used early, selective announcements in order to maintain its monopoly position in the marketplace.

In January 1967, the issue arose when R.W. O'Keefe, director of financial analysis for the DP group, refused a request from the Swiss National Railways for information on automated railway control that was still under development at IBM.

O'Keefe said he did not think that situation had "the urgency that would require such a disclosure.

"My definition of national interest would be a situation which (1) involves the national defense and security [or] (2) is critical to health or welfare of the nation. I would also add the additional qualification that the disclosure is not available from other sources," O'Keefe said.

However, he was quickly answered by H. Bartow Farr, general counsel of the DP Group.

"If it is my responsibility to interpret national interest," he wrote, "I will do it as I have done in the past, i.e., financial interest is sufficient, no patriotism, health, welfare, etc. is required...Using the Robinson-Patman Act as an analogy, I have concluded and confirm my conclusion that there is no antitrust risk from defining national interest the way I have defined it," he stated.

CI Notes

Texas Department Store Selling Altair System

HOUSTON — Foley's, a department store chain here, is taking credit for being the first mass merchandiser to stock computers since it now offers a $4,995 Altair computer from Pertec Computer Corp. and a variety of software.

The Altair 8800b turnkey system with minifloppy disks will be sold for both business and home applications, according to Joseph Sternberg, Foley's divisional merchandise manager.

The applications programs that will be available from Foley's include a mailing list maintenance file, a small business check maintenance file, four games, a home check maintenance file and an auto log for car expenses.

Court Nixes CDC Contract For Pennsylvania Lottery

HARRISBURG, Pa. — A court here has invalidated Control Data Corp.'s contract for equipment and services used in the state's "Daily Number" lottery.

The award violated provisions of Pennsylvania state law calling for "fair, open, honest bidding," the judge said, after a complaint had been filed claiming that CDC was allowed to change its bid after open bidding.

The complaint was brought by General Instrument Corp., which claimed that a bid by its American Totalisator subsidiary was the low bid on the contract before CDC was allowed to change its quote.

The bidding will be reopened.

CCIA Joins Growing Opposition To Proposed I/O Link Standard

WASHINGTON, D.C. — The current implementation procedures of the proposed federal channel-level I/O interface standard "completely fail to achieve the intended benefits of this vital standard for either users, providers or the tax-paying public."

In a letter to the National Bureau of Standards (NBS), proposer of the latest version of the Federal Information Processing Standard (Fips), Computer & Communications Industry Association (CCIA) President A.G.W. (Jack) Biddle attacked the existing proposal.

In objecting to the current version of the proposed standard, the CCIA joined in opposition other notables such as Rep. Jack Brooks (D-Texas), chairman of the House Government Operations Committee [CW, Oct. 31], and Norman Ream, former head of the NBS' Institute for Computer Sciences & Technology [CW, Sept. 12].

If properly drafted, such an interface standard could save the federal government about $150 million/year, Biddle said.

The current federal expenditures that would be impacted by the standard are about $700 million/year, and Biddle said it would be reasonable to expect a 20% to 30% decline in pricing of non-IBM-type peripherals, just as there has been in the competitive IBM-type market.

Attacking the standard, Biddle said, "We see absolutely no justification for a limitation on the number of channels that should conform to the standard. Every channel that is required for the interconnection of the CPU to its associated peripheral equipment should conform."

Currently, the revised version requires that one channel accommodate the standard with a maximum requirement of four such channels.

'CPU' Not 'System'

The CCIA would like the proposed standard to substitute "CPU" for the word "system" because this emphasizes to user agencies that they can acquire their CPU separately and competitively with standardized channel-level interfaces, software, maintenance and peripheral equipment.

The CCIA also disputed the clause that enables agency heads to waive the proposed standard. To do so makes a mockery of the entire Fips standardization process.

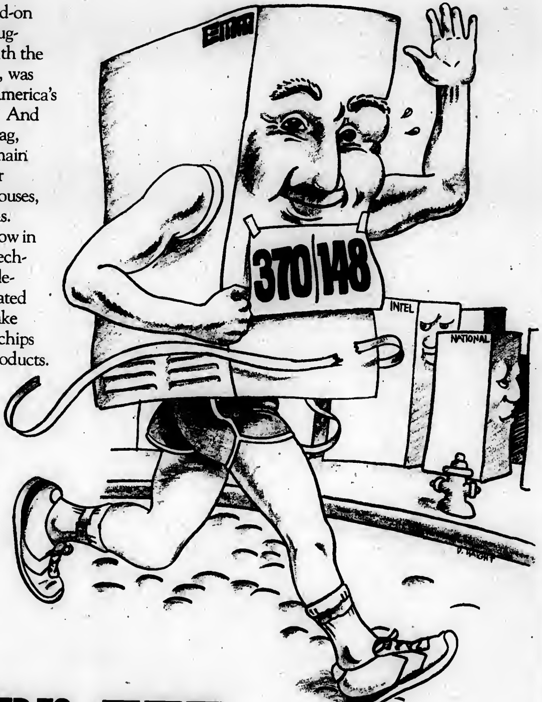
Adherence to an I/O channel-level interface standard is important because peripherals now represent 65% to 70% of the total system cost, Biddle observed, compared with 20% to 30% a decade ago.

Twice the performance of a 370/158 at one half the price of a 370/168. 370/165-the logical choice.

Re-THINK

COMDISCO
THE LOGICAL CHOICE
[illegible] Rosemont Ill 60018 (312)698-30
[illegible] • Minneapolis [illegible] • New Jersey (201) 568 9666 • San Francisco (415) 944 1

EMM BEATS THEM ALL WITH THE FIRST WORKING 370/148 ADD-ON MEMORY



We've just set a record with the first installed 370/148 enhanced add-on memory. Our new 370/148 plug-compatible add-on memory with the same static technology as IBM, was recently put on-line at one of America's fastest growing service bureaus. And it's operating beautifully. No brag, just fact. EMM continues to remain way out in front of all the other independent add-on memory houses, for a lot of very practical reasons. Including more years of know-how in IBM-compatible, static RAM technology than any of the other independents. And vertically integrated manufacturing facilities that make everything from the plug-in 4K chips to the easy-to-install finished products. And an exceptional track record with 370/158 and 168 add-on memory packages.

Fast response to a fast changing market. That's what you get from the company that's committed to setting new add-on memory records. Who knows? Some day we may even make the Guinness Book of world records.

COMMITTED TO MEMORY ALL THE WAY

EMM COMPUTER PRODUCTS
A Division of Electronic Memories & Magnetics Corporation.
3216 W. El Segundo Blvd., Hawthorne, CA 90250

For more information, call your regional EMM sales office Eastern (201) 845-0450. Central (312) 297-3110. Western (213) 477-3911 Europe Bad Homburg, West Germany 06172/6094

After 13 Weeks

NCR Employees Vote to End Strike in Dayton

By Molly Upton
CW Staff

DAYTON, Ohio — The 13-week strike by NCR employees at its Dayton Terminal Systems Division and Microelectronics Division plants here is ending.

Members of the Auto Workers Local 1616 voted to accept the terms of a three-year contract that offers improved group and retirement benefits, an NCR spokesman said. All employees will have returned by the end of this week, he added.

The firm had previously decided to keep its microelectronics plant here open. But it was moving to shutdown the terminal plant.

The Dayton terminal plant is one of four NCR sites in the U.S. that produces financial terminals. Throughout the 13-week strike, NCR has declined to comment on its impact except to say that limited production had been maintained using nonstriking employees.

The terminal plants are principally assembly units, whereas the manufacture of much of the circuitry is done by the microelectronics plants, an NCR spokesman said.

The data presented by NCR showed that its labor costs for the Dayton Terminal Systems Division are nearly $1/hr higher than for other similar plants in the U.S.: $5.01 vs. $4.03, he said.

Retirement Issue

One of the key areas of disagreement between the United Auto Workers Local 1616 and NCR was early retirement, the NCR spokesman said.

The average age of the Dayton Terminal Systems Division's employees is 53, because when NCR began its conversion from electromechanical to electronics products, the labor content was reduced and the unions applied the principal of seniority leaving NCR with the older employees, he said.

New Agreement

The new agreement, ratified by a vote of 519 to 220, includes a minimum wage rate of $5/hr and a grow-in feature for pension support.

Under the new contract, employees reaching age 54 and 25 years of service during the contact term are eligible for the benefits, whereas previously, they had to be 54 and have worked for 25 years at the beginning of the contract term.

Also, the contract lets employees receive group benefits through the age of 65 and provides extended group benefits to those laid off, he said.

Previous Negotiations

During the previous contract negotiations, the union accepted a lower wage rate than what it had been receiving, so "there has been a great deal of labor difficulty," the spokesman observed.

The Dayton Terminal Systems Division had about 650 employees on strike and about 750 more nonunion employees, he said.

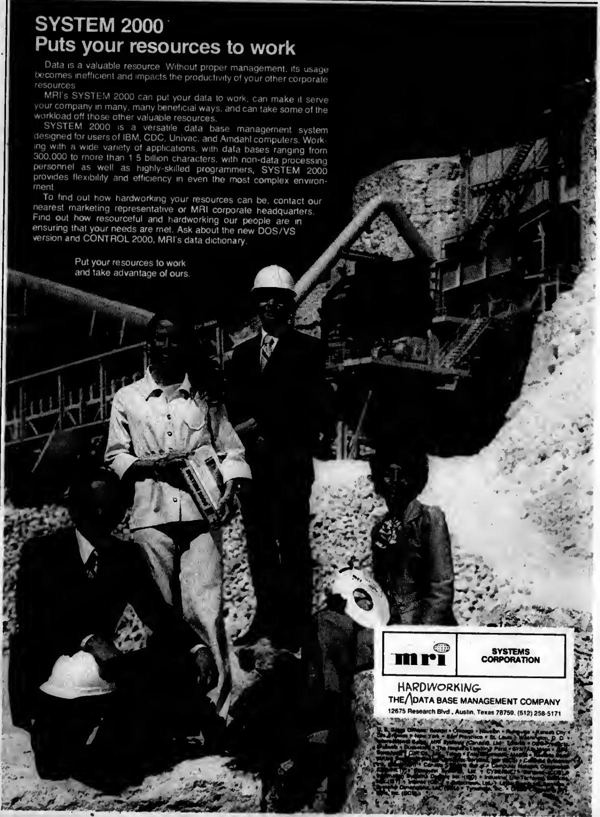
Plant Locations

The other terminal plants are in Cambridge, Ohio; Ithaca, N.Y.; and Millsboro, Del., he added.

The firm determined that it was economical to continue operating the Microelectronics Division plant in Dayton, he said.

Although NCR does not supply all of its own semiconductor needs, it does supply a fair amount, he indicated. Also, the firm has special requirements that it can satisfy through its own manufacturing facility, according to the spokesman.

158
AVAIL. DEC 1
LEASE ONLY
Call: Pat Baker
COMDISCO
312-698-3000



SYSTEM 2000
Puts your resources to work

Data is a valuable resource. Without proper management, its usage becomes inefficient and impacts the productivity of your other corporate resources.

MRI's SYSTEM 2000 can put your data to work, can make it serve your company in many, many beneficial ways, and can take some of the workload off those other valuable resources.

SYSTEM 2000 is a versatile data base management system designed for users of IBM, CDC, Univac, and Amdahl computers. Working with a wide variety of applications, with data bases ranging from 300,000 to more than 1.5 billion characters, with non-data processing personnel as well as highly-skilled programmers, SYSTEM 2000 provides flexibility and efficiency in even the most complex environment.

To find out how hardworking your resources can be, contact our nearest marketing representative or MRI corporate headquarters. Find out how resourceful and hardworking our people are in ensuring that your needs are met. Ask about the new DOS/VS version and CONTROL 2000, MRI's data dictionary.

Put your resources to work
and take advantage of ours.

mri SYSTEMS CORPORATION
THE HARDWORKING DATA BASE MANAGEMENT COMPANY
12675 Research Blvd., Austin, Texas 78759, (512) 258-5171

U. S. Sales Offices: Boston • Chicago • Houston • [illegible] • Kansas City • [illegible] • New York • San Francisco • St. Louis • Washington, D.C. [illegible]

GA Moving From OEM to Packaged Systems

By Molly Upton
CW Staff

NEW YORK – General Automation, Inc. is making the transition from an OEM systems house to the producer of packaged systems for the multiple unit buyer, according to Marv Silverman, manager of systems marketing.

Currently the firm's only entry in the small business marketplace is the 440 Data Series (DS) but Silverman said he intends to expand that line with the 110, 220, 330 and 550, which are currently marketed on an OEM rather than systems basis.

The firm intends to have total upward compatibility throughout its line of packaged systems, he said, and plans to add to its range of offerings and peripherals.

For example, the 440DS will be available with the IBM 2780 communications feature and eventually the 3270, he said, but the integration of the feature into he system first has to be thoroughly checked out.

Other enhancements for the 440DS are likely to include semiconductor-memory, capacity beyond 128K, the addition of virtual storage and higher speed tape drives, he said.

The firm now has some virtual 440s at beta test sites, he indicated.

Eventually Silverman sees users incorporating 440s into a network and off loading IBM 370s.

In addition, the firm has implemented the IBM Synchronous Data Link Control (SDLC) protocol for Wells Fargo Bank's participation in the Swift network, so that capability could potentially be added to the standard product line, he said.

Currently a development 440 system, which includes operating software, costs $45,000 and features one 10M-byte disk, a 200 line/min printer, a 400 card/min card reader and two CRTs.

The system can have up to six CRTs with a 10M-byte disk and up to 16 with 80M bytes.

The software includes Cobol, a multiple terminal capability, a file management system and the Control 3 operating system. Of the 128K of core, half is available to the user and compiling takes only two of the 16K partitions, Silverman said.

To handle the change in marketing direction from custom-built items to emphasis on selling packaged systems, GA is beefing up its sales force, field service and software support, Silverman said.

OEM sales during 1978 should continue to climb and packaged sales should show a sharp rise, while custom systems business should decline, he predicted.

Since GA has concentrated responsibility for packaged systems, data series, industrial products and peripherals under Silverman, the firm should be able to cull particular features from its custom products for inclusion in the packaged and OEM offerings, he said.

Get It All Together...

Running a tight shop is more difficult these days than ever before. There's more to know. And more to do. So why not do for yourself what you've done for your users?

With JOBDOC, you build a data base of everything you need to know about running your jobs. And then let JOBDOC go to work:

- Controlling Costs
- Monitoring File Relationships
- Generating Complete Job Requirements
- Cross Referencing All Job Related Information
- Providing Operating Statistics
- Giving You A Better Audit Trail Than You Ever Thought Was Possible.

JOBDOC: When you want an easier way to do a tougher job.

Gulf Computer Sciences Inc.
1775 St. James Place
Houston, TX 77027
Tele. 713-627-9320

Contracts

Distronics Corp. has received a contract from Nicklas Supply Co. to supply the firm with a DP system to automate business operations.

Datatrol, Inc. has received a contract from the state of Rhode Island to develop, implement and operate a computerized on-line "Daily Numbers Game" for the Rhode Island Lottery.

RCA American Communications, Inc. has been awarded a contract by the National Aeronautics and Space Administration (Nasa) for satellite communications links to support NASA's Space Shuttle Program and its Tracking and Data Relay Satellite System.

Storage Technology of Canada, Ltd. has been awarded contracts by the Quebec government for the installation of magnetic tape subsystems in the government's seven computer installations located in six different departments in Quebec City and Montreal.

Kennedy Co. has been awarded a contract by Cygnet of Montreal, Canada, for Kennedy's Model 9300 tape transport and associated controllers.

Hazeltine Corp. has received a contract from the U.S. Army's Electronics Command, Fort Monmouth, N.J., for 17 AN/TPX-46 IFF Ground Interrogator Systems and associated test and data items.

General Electric's Information Services Division has received a contract from Hospital Corp. of America (HCA) for the processing of HCA's management systems for the health care industry.

Business Systems Products, Inc. has been awarded a contract by WEI Corp. to install and maintain a computer system to automate the manufacture of heat dissipating components.

The Foxboro Co. has been awarded a contract by Wyeth Laboratories, Inc. for a computer-based process control system.

Texas Instruments, Inc. has received a contract from PRC Electronics, Inc. for Silent 700 data terminals.

Metrodata, Inc. has received a contract from the Kuwait Ministry of Electricity and Water to supply computer-controlled tank-level and pump control systems.

Fisher Elected Chairman

Wema Forms New England Group

FRAMINGHAM, Mass. — The Western Electronics Manufacturers Association (Wema) has formed a New England Council with 35 members.

At the group's first meeting here, Kenneth G. Fisher, president of Prime Computer, Inc., was elected chairman of the New England Council.

The New England unit is represented on the Wema board of directors by Fisher as well as by Edson de Castro, president of Data General Corp., who is a director at large.

The new members have expressed their interest in the business climate in Massachusetts, particularly those aspects that affect a firm's ability to attract employees.

DG has found it is much easier to attract programming talent to its site in North Carolina than to its operations in Massachusetts, according to De Castro.

Fisher mentioned that a survey indicated MIT graduates are not enthusiastic about remaining in Massachusetts because of the income tax situation.

The Wema membership includes 1,100 electronics firms in 34 states.

Further information on the New England Council can be obtained from Ken Ritchie, The Fairways, Rte. 122, Amherst, N.H. 03031.

At the first meeting of Wema's New England Council, Ken Oshman, president of Rolm Corp., met with Kenneth Fisher, president of Prime Computer, Inc. and Edson de Castro, president of Data General.

Micro Makers Form Unit

PRINCETON, N.J. — The Microcomputer Manufacturers' Association has been formed to handle areas of mutual interest, such as the prevention of conflicting dates for shows, according to Chris Rutkowski, president of Technical Design Labs, one of the group's organizers.

The area of most immediate concern is the scheduling of shows, he said. After that the association will probably undertake projects in such areas as setting standards.

For further information, contact Rutkowski at Technical Design Labs, Research Park Bldg. H, 1101 State Road, Princeton, N.J. 08540.

Service Group Now 435 Strong

DANBURY, Conn. — The Association of Field Service Managers, formed in August 1976, has grown to 435 members from 94 different organizations, according to Executive Director Thomas Ross.

The purpose of the organization is to develop maintenance management of sophisticated technologies as a separate management function, he explained.

As part of its objectives, the group seeks to improve product performance, operate service as a business, develop service professionals and improve service organization effectiveness.

The AFSM plans to conduct seminars and workshops and assist in the development of formal field service programs in colleges as a means of increasing the professionalism associated with the service industry.

The organization has nine active chapters throughout the U.S. and expects to form three more before the end of the year, he added. It also plans to form one in England, he added.

Individual membership dues are $75. For further information write AFSM, P.O. Box 255, Danbury, Conn. 06810.

YOUR OFFICE IS WAITING!

The solution for a fully staffed, furnished, luxurious office with a prominent address, eliminating capital investment, and long leases Monthly programs from $150 to $650

ATLANTA OFFICES: Downtown-Peachtree Center and Suburban-Powers Ferry Landing/**(404)-955-1040**

CHICAGO OFFICES: on North Michigan Ave at Ontario St /**(312)751-2700**

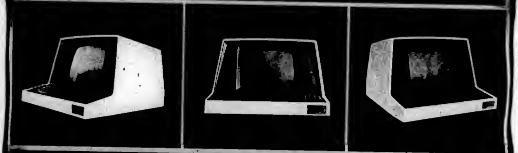
HOUSTON OFFICES: Downtown-Allen Center and Suburban-One Woodway Dr./**(713) 965-0060.**

NEW YORK OFFICES: the Chanin Building at Grand Central Station/**(212) 887-5750**

OR WRITE FOR BROCHURE:
Jewell Taylor Omni Offices, Inc /10th Floor/
One Allen Center/Houston, Texas/77002

MAIL SERVICES • INDIVIDUAL TELEPHONE COVERAGE
SECRETARIES • LOBBY DIRECTORY • PHOTOCOPIERS • ST
CONFERENCE ROOMS • TELEX • TWX • OFFICE STAFF • RECEPTION

WANTED



IQ 120

DESCRIPTION

- Lower Case
- Tabbing
- Dual Intensity
- 24 Line x 80 Char.
- Numeric Pad
- Auto Repeat
- Aux. Port
- Optional Printer Port & Block Mode
- Protect Mode
- 15 Baud Rates
- Addr. Cursor

at $750.00* the OROC IQ 120 is the most wanted OEM terminal on the marke

For information concerning the REWARD contact...

SOROC
TECHNOLOGY, INC.
165 FREEDOM AVE., ANAHEIM, CA 9
714-992-2880 / 800-854-0147

Financial News

In Three Months Net

Amdahl Tops $6 Million

MONTEREY, Calif. — Amdahl Corp. earned $6.4 million on revenues of $46.4 million in the quarter ended Sept. 30, according to a condensed balance sheet released to security analysts meeting here at the recent Western Electronic Manufacturers Association conference.

Outright sales accounted for $44.7 million of the revenues. Lease and maintenance revenues totaled $1.7 million.

For the nine months, Amdahl showed earnings of $27.6 million on revenues of $129.6 million; $125.4 million of the revenues came from outright sales.

On a fully diluted basis, the earnings per share were $.80 for the three-month period and $3.53 for the nine months.

For the nine-month period, the condensed balance sheet showed an extraordinary credit of $9.9 million as the result of a tax benefit from a net operating loss carryforward. However, no credit was taken for the quarter ended Sept. 30.

That extraordinary item accounted for $1.25 per share on the nine-month earnings, according to the statement.

Banner Year for DG

WESTBORO, Mass. — The year 1976 was a banner one for Data General Corp., which reported record earnings and revenues for the 12 months ended Sept. 24.

Earnings rose to $28.6 million or $2.88 a share compared with $20.8 million or $2.11 a share in the previous year. Results were restated to include Digital Computer Controls, Inc., which was acquired on a pooling-of-interests basis.

Revenues grew to $254.7 million compared with $178.8 million last year.

For the final 16 weeks, earnings totaled $9.9 million compared with $7.5 million in the year-ago period. Revenues surged to $87.5 million compared with $63.5 million.

During the year, DG's employment rose to 8,590 from 6,190, using 1976 figures restated to include DCC.

Shipments of computers grew to 3,400 from 3,100, the firm said.

Memorex Earnings Up 35%

SANTA CLARA, Calif. — Memorex Corp.'s operating earnings rose 31% and revenues were up 35% during the third quarter ended Sept. 30.

Before tax credits, Memorex's operating earnings reached $8.4 million compared with $6.4 million in the year-ago period. Including a $5.7 million tax credit, quarter earnings totaled $14.1 million or $2.19 a share compared with $10.3 million or $1.80 a share in the 1976 period, when there was a $3.9 million credit.

Revenues reached $114.1 million in the quarter compared with $84.3 million in the same period last year.

For the nine months, the firm earned $40.9 million or $6.10 a share, including a $16.3 million credit, compared with $28.5 million or $4.55 a share, including a $10.8 million credit, in the year-ago period.

Nine-month revenues totaled $326.1 million compared with $244.6 million in the same period last year.

The nine-month figures for 1977 include the operating results of Business Systems Technology.

Memorex said it reduced its total debt by $5.5 million in the quarter from $148.9 million to $143.4 million. Cash and temporary investment balances at the end of September dipped to $35.8 million from $40.2 million a year ago.

Total shareholders' equity increased to $98 million from the $80.9 million reported at the end of the second quarter, the firm said.

42,178 buyers attended the 1977 Computer Caravan 9-city tour... that's an increase of 32%

Computer Expo '78 is part of a nationwide Conference and Exposition program, which each year serves the computer community by bringing nine regional Computer Expos to the most important business areas in the U.S.

If you're marketing computer products or services, then you'll want to be in one or more of the regional Computer Expos beginning in March. How else can you meet well over 50,000 computer buyers across the country in just nine short weeks?

You'll want to exhibit at one or more of these shows, but for PRIME positioning, you've got to reserve space NOW:
For complete information on how the 1978 Computer Expo tour can work for you, use the coupon below or call Kim Wichert at (617) 964-4550 (collect).

Keep in mind, your prime prospects will be at Computer Expo '78... so will your competition.

COMPUTER EXPO '78

Exhibitor List as of September 1977.

AT&T Company
American Microprocessor
Anderson Jacobson
Ann Arbor Terminals
Applied Data Communications
Applied Digital Data Systems
Atlantic Research
Beehive International
Computer Corporation of America
ComData
Computer Devices
Computer Input Services
Computer Associates
Computerworld
Computrend
Continental Peripherals
Creative Engineering
Cullinane
Datapro
Data Forms Company
Data Processing Sciences
Data Systems Specialists
Delta Data Systems
Diablo Systems
Digitronics
E M & M
Epic Data
Extel
General Computer
General DataComm Industries
Genesis One
Graphic Controls
Hewlett Packard
I & M
Imperial Technology
Inforex
Informer
International Data Corp
Intertec Data Systems
Key Tronic
Kodak
Lear Siegler
Marketechs
Mathematica
Moore Business Forms
The Morley Company
NCI
Pansophic Systems
Peradyne
Perkin-Elmer
PCC/Pertec
Programs, Inc
Qume
Racal-Milgo
Rianda Electronics
Software AG
Sykes Datatronics
Sycor
Tandem Computer
Telcon Industries
Telefile Computer Products
Terminal Rentals
Texas Instruments
Varsatec
Western Union

Choice Booths still available

I'm interested in exhibiting in the following Expos:

To: KIM WICHERT
President
THE CONFERENCE COMPANY
60 Austin Street
Newton, MA 02160

☐ Southern California Computer Expo	Anaheim/LA	March 21-23
☐ Northwest Computer Expo	San Francisco	March 28-30
☐ Southwestern Computer Expo	Houston	April 11-13
☐ Southeastern Computer Expo	Atlanta	April 18-20
☐ Gateway Computer Expo	St. Louis	April 25-27
☐ Midwestern Computer Expo	Chicago	May 2-4
☐ Mid-Atlantic Computer Expo	New York	May 9-11
☐ Great Lakes Computer Expo	Detroit	May 23-25
☐ New England Computer Expo	Boston	May 30-June 1

☐ Have Sales Representative call me
☐ Send Reservation Agreement
☐ Send Copy of 1977 Attendee Analysis

Name ________ Title ________
Company ________
Address ________
City ________ State ________ Zip ________

Nickels & Dimes

Control Data Corp. expects data services revenues, which are growing at a compound rate of over 20%, to reach $300 million in 1977, according to Robert M. Price, president of the firm's computer group.

The market for data services is now about $6 billion to $7 billion and should reach about $11 billion by 1980 in the U.S. and Western Europe, he said.

Sales of peripheral products were up 32% in the first three quarters of the year compared with the same period last year.

$ $ $

IBM declared a regular quarterly dividend of $2.50 per share on common stock payable Dec. 10 to holders of record Nov. 9

$ $ $

Storage Technology Corp. is offering to repurchase the total outstanding amount of convertible subordinated notes due 1993 through Nov. 14, which could cost the firm $7.9 million.

Fold and insert order form (attached through binding) and remittance here.

USE THE ATTACHED ORDER FORM AND THIS ENVELOPE FOR:

a new subscription
new address
☐ *new title*
☐ *new industry*

Order form is attached through binding. Be sure to include current label or label information when making a change.

first class
permit no 40760
newton ma

BUSINESS REPLY MAIL *no postage stamp necessary if mailed in the United States*

postage will be paid by

COMPUTERWORLD
797 Washington Street
Newton MA 02160

CIRCULATION DEPARTMENT

CDC Units Read, Sort Micr Documents

MINNEAPOLIS — Control Data Corp. has announced two magnetic ink character recognition (Micr) document-processing units that it said can read and sort encoded checks, credit card charges, etc. at over 35,000 document/hour.

The 92660 reader/sorter separates magnetically encoded documents according to predetermined sets of characteristics and sorts similar groups into six individual pockets.

The 92660 can process intermixed documents of various sizes that meet American Banking Association specification at rates up to 830 6-in. document/min, CDC said.

The unit can be remotely located and costs $28,000 in single quantities.

The larger 92680 has 14 document pockets and can handle optical character recognition and optical mark reading at the same time it is reading and sorting magnetically encoded documents, the firm said. Options for the unit include off-line sort and outsort/edit, which verifies documents, CDC said.

The 92680 costs $58,000, it added, and quantity prices are available for both units. CDC can be reached through P.O. Box O, Minneapolis, Minn. 55440.

Control Data Corp.'s Model 92660 reader/sorter reportedly sorts over 35,000 documents per hour.

OEM Products

Talos Unwraps Digitizer

SCOTTSDALE, Ariz. — Talos Systems, Inc. is offering a digitizer for the OEM market which has an 11-in. by 11-in. active surface area.

The Simple One is a self-contained unit with stylus priced at $995 in quantities of 100. It can replace joysticks, lightpens and trackballs for CRT cursors as well as provide precision graphics capability, according to the firm.

The Simple One combines benefits of source data entry, menu selection and display manipulation with precise graphic data input, the firm addd.

The unit has 200 line/in. resolution and ± .02 in. accuracy. A 16-bit binary interface is standard, but an RS-232C costs $200 in single unit or $145 in quantity.

Talos Systems, Inc. is at 7419 E. Helm Drive, Scottsdale, Ariz. 85260.

VRC Memories Hold 37.9M Bits

N. SPRINGFIELD; Vt. — Vermont Research Corp. is delivering fixed-head memories that have a 37.9M-bit storage capacity and access time of 8.5 msec.

The 4016-DC, designed for use in telecommunications systems where power interruptions cannot be tolerated, operates on 48 VDC input power.

The Model 4016-DC costs $13,390 and the AC unit is $12,370 when purchased in quantities of 100 per year from the firm at Precision Park, North Springfield, Vt. 05150.

Impact Printer Bows

NEW YORK — C. Itoh Electronics, Inc. has announced a 40-column dot matrix impact printer with guaranteed continuous duty head life of 100 million characters.

Printing speed is 2.5 line/sec and the price in sample quantities is $210 each for the second-generation Series 500 units.

C. Itoh is at 280 Park Ave., New York, N.Y. 10017.

Part & Parcel

A large alpha numeric LED matrix display called "Datablox" has been introduced by Chicago Miniature Lamp Works for use in illuminated displays. The Datablox provides alphanumeric digits 4 in. by 3 in. and uses 35 (5 x 7 matrix) high-intensity LEDs mounted in individual reflectors. The cost is $60 each or $40 per 100 from 4433 N. Ravenswood Ave., Chicago, Ill. 60640.

• • •

Maxi-Switch Co. has introduced a Selectric-style keyboard that can also be ordered with a 12-key numeric pad.

The basic keyboard cost is $115 in small quantities from 9697 E. River Road, Minneapolis, Minn. 55433.

Sooner or later your management is going to ask you for a casualty risk and insurance information system, so . . . you should know about

corporate systems

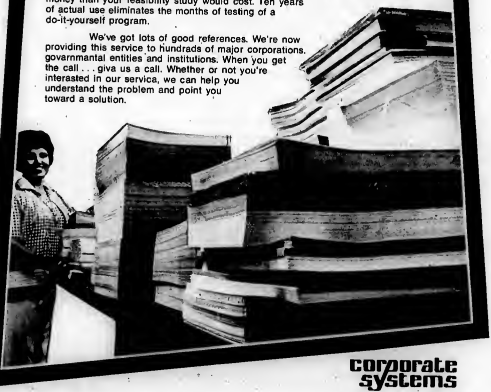
a company devoted exclusively to Risk and Insurance Information

Our only business is helping corporations, governments and institutions control the mushrooming cost of accidental loss. Information is essential to reducing these costs. Our system provides your insurance department and/or top management with monthly or quarterly reports covering any or all of these things:

- total risk cost—insured, self-insured and non-insured
- the how and why of all losses
- allocation of cost-of-risk to corporate subdivisions based on experience as well as exposure (forecast premium allocation with retrospective adjustments)
- monitor claim reserves or determine an IBNR for self-insurance
- accurately allocate property premiums
- show how risk and risk management is affecting the corporate P & L

We can have a system operating for your company sooner than you could complete a feasibility study—and for less money than your feasibility study would cost. Ten years of actual use eliminates the months of testing of a do-it-yourself program.

We've got lots of good references. We're now providing this service to hundreds of major corporations, governmental entities and institutions. When you get the call . . . give us a call. Whether or not you're interested in our service, we can help you understand the problem and point you toward a solution.



corporate systems

P. O. Box 2827, Amarillo, Texas 79105
(806) 378-4223 (800) 858-4180 (toll free outside of Texas)

Also: Corporate Systems Australia, 492 St. Kilda Road, Melbourne, Australia

Microcosm

Intel 8-Bit Micro Costs $3

SANTA CLARA, Calif. — Intel Corp.'s Microcomputer Division has announced an 8-bit microcomputer that costs $3 in large OEM quantities.

The 8021 single-chip system contains an 8-bit control processor with a 10 microsec instruction cycle time, the firm said.

The 8021, which has been optimized for control applications, is the low end of the MCS-48 microcomputer product line. It executes over 60 different instructions, a subset of the 8048 instruction set, with no instruction requiring more than two cycles to execute, Intel said.

The 8021 also has 64 bytes of read/write data memory, 1K byte of program memory, 21 I/O lines and all other generally required functions such as programmable interval timer/event counter and system clock and oscillator, the firm said.

The 8021 can operate off dc voltage in the range of 4.5V to 6.5V. Programs are stored in masked read-only memory.

The unit has an on-chip oscillator that can be externally synchronized with a crystal or a TTL-level clock signal, Intel said.

Product development is supported by the other MCS-48 features and by the EMB-21 emulator board, the firm said from 3065 Bowers Ave., Santa Clara, Calif. 95051.

Rockwell Adds 32K Static ROM

ANAHEIM, Calif.— A 32K static n-channel read-only memory (ROM) has been designed by Rockwell International to support the company's R6500 microprocessor family and to be compatible with other microprocessors.

The RS2332 features a typical access time of 250 nsec and uses 350 mW of power. One +5V power supply is required, the firm said.

Asynchronous Operation

The unit operates totally asynchronously and requires no clock input and is organized with 4K words by 8 bits.

The RS2332 has the same pinout as the 2316 ROM with pin 18 being an address pin instead of a chip select.

Packaged in a 24-pin plastic package, the Rockwell R2332 is priced at $20.10 in quantities of 1,000.

Rockwell is at 3310 Meraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803.

Astral Offering One-Board Unit

PALO ALTO, Calif. — Astral Computer Co. is offering the 2000 microcomputer, which is based on the 6800 microprocessor. The unit is available as a single-board computer or in a case complete with power supply and mother board.

Separate cards contain the processor, memory, I/O and floppy disk interface.

System Support

The system is supported with extended 8K Basic, assembler, a text editor and disk operating system, Astral said.

The processor provides direct memory addressing through cycle stealing, a spokesman added.

The 2000 with Astral Basic on erasable programmable read-only memory and one 8K random-access memory board costs $2,450 each for less than nine units and $1,600 each for over 50 units from the firm at Suite 2, 991 Commercial Street, Palo Alto, Calif. 94303.

System Debugs Pace Designs

SANTA CLARA, Calif. — The Low-Cost Development System (LCDS) from the Microcomputer Group of National Semiconductor Corp. lets engineers develop, test and debug Pace hardware and software designs for a basic cost of $585.

The Pace LCDS card consists of a 16-bit Pace microprocessor, 1K words of random-access memory (RAM), sockets for 1K words of programmable read-only memory (Prom), a 20-key dual-function keyboard, a six-digit LED display, a system-timing element, input/output buffers and bidirectional transceiver elements.

The Pace LCDS is priced at $585 each while the IPC-16C/011 RAM cards cost $170 each.

The IPC-16C/012B Prom cards with blank sockets cost $139 and the IPC-16P/802 cable assembly $145.

National Semiconductor Corp. is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Futuredata System Tests Two Micros

LOS ANGELES — Futuredata Corp. is offering a system that it said permits testing of two different microcomputer-based systems simultaneously.

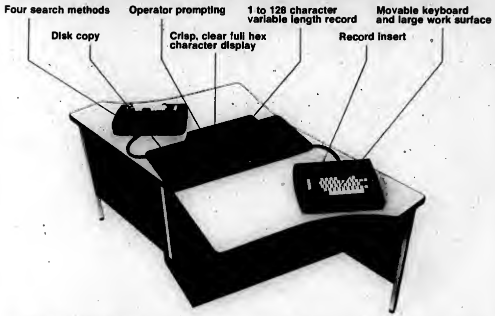
The Universal Dual Microcomputer Development System consists of two tape-based 8K systems including two CRTs, keyboards, tape units and operating software and manuals.

It costs $5,850 and includes a choice of 8080, 6800 or Z80 microprocessors for each half of the system.

Futuredata, which was formerly Microkit, Inc., is at 11205 S. La Cienaga Blvd., Los Angeles, Calif. 90045.

New Tab System 700-
Best price/performance yet in key to diskette entry!

The New Dual Station 702 Has These Standard Features At No Extra Cost


Four search methods
Operator prompting
1 to 128 character variable length record
Movable keyboard and large work surface
Disk copy
Crisp, clear full hex character display
Record insert

Additional Exclusive Standard Features Assure Better Performance

- **High-speed diskette data searches**
- **Constants from memory and character insert/delete save keystrokes**
- **Operator productivity enhanced with six display lines**
- **Teleprocessing and optional interfaces provide for a wide range of attachments**

Tab's System 700 Will Deliver Increased Throughput for your Dollar
The new TAB 700 System, single or dual station, is designed for operator efficiency and maximum data entry throughput. Our movable keyboard allows operators to select their most comfortable and productive positions. The CRT displays up to 240 characters to each operator, thereby allowing prompting and a complete display of the full 128 character record. In addition, the System 700 features extra large display characters for easy viewing and reference. The tabletop provides space for even the largest of source documents.

Exclusive Uninterrupted Data Keying
With 10 program levels and 84 characters of constants per station, the 702 allows each operator uninterrupted data keying. A data record can be located and displayed in less than sixty seconds. Our field-installable options provide the capability of attaching magnetic tape, printers, and our TAB 501 Microprocessor Punch-Verifier.

Whether your needs are distributed or central, local or remote, TAB offers you a complete key-to-diskette system. Want to know more? Call your Tab representative, or write Tab Products Company, 2690 Hanover Street, Palo Alto, California 94304.

TAB
PRODUCTS CO

Decoders Eliminated

National Cards Aid Control System Design

SANTA CLARA, Calif. — National Semiconductor Corp.'s SC/MP-II family of microcomputer CPU, read/write memory and read-only memory boards is said to reduce overall system costs by incorporating features that eliminate decoders, latches and other external devices normally required for control systems.

The ISP-8C/100N CPU gives 1 microsec per microcycle instruction-execution and requires a single +5V power supply, the firm's Microcomputer Systems Group said.

12-Bit Address Bus

Although the SC/MP-II processor is an 8-bit device, communications between the CPU and memory/-peripherals are through a 12-bit address bus and an 8-bit bidirectional data bus, the firm said.

Built-in logic allows multiprocessor and direct memory access applications.

The unit also has single-bit control and sense lines build into the chip, the firm said.

In quantities less than 10, the ISP-8C/100 CPU boards cost $250 and the ISP-8C002N board with 2K by 8 bits of random-access memory costs $160. The ISP-8C/004P programmable read-only memory (Prom) card, with 4K by 8 bits, costs $525.

National Semiconductor Corp. is at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Microcosm

Intel Has 16K RAM Family

SANTA CLARA, Calif. — Intel Corp. has unveiled its second family of 16K-bit random-access memories (RAMs), the 2117, which provides direct replacements for all types of first-generation 16K RAMs, the firm said.

The 2117 is based on the same N-MOS process used to produce the Intel 2116, but the chip design gives the 2117 the highest performance achieved to date in producing 16K RAMs, Intel claimed.

Other Models

The 2117-2 has 150-nsec maximum access and 320-nsec read or write, while the 2117-3 with 200 nsec maximum access has 375-nsec read or write. The 2117-4 has 250-nsec maximum access and 410-nsec read or write, the firm said.

The 2117 replaces the latched 2116 as well as the unlatched 4116 and a system designer can use a new 2117 clock mode that provides the equivalent of a latched output, the firm said.

In quantities over 100, the 2117-2 costs $55, the 2117-3, $41, and the 2117-4, $39. Intel is at 3065 Bowers Ave., Santa Clara, Calif. 95051.

Zilog Adds 4K Static RAM

CUPERTINO, Calif. — Zilog, Inc. has expanded from microprocessors into the realm of memories with production of its 4K static random-access memory (RAM), the Z-6104, which the firm said has access time of 200- and 250 nsec.

The Z-6104 is pin-compatible with Mostek's MK 4104, Zilog said.

Zilog said it plans to offer the Z-6104 with an access time of 100 nsec.

The 200 nsec RAM costs $22 in quantities of 100 to 999 in ceramic packages and the 250 nsec version is priced at $20.

Zilog is at 10460 Bubb Road, Cupertino, Calif. 95014.

LSI-11
COMPONENTS
All new approx. 15% off list

LSI-11 SYSTEMS

LSI 11 CPU, 56k byte MOS RAM, one serial and one parallel IF H909C and DDV11 with power pac
$3600

PDP11/03 in half-high cabinet, 40k byte MOS RAM memory, DLV11 serial IF & cable, LA36DECwriter
$9600

LSI 11 computer system in desk 56k bytes MOS RAM memory, DLV11 parallel printer interface, all cables, VT52 DECscope LA180 DECprinter RT11 with either Fortran IV or Multiuser Basic
$15,900

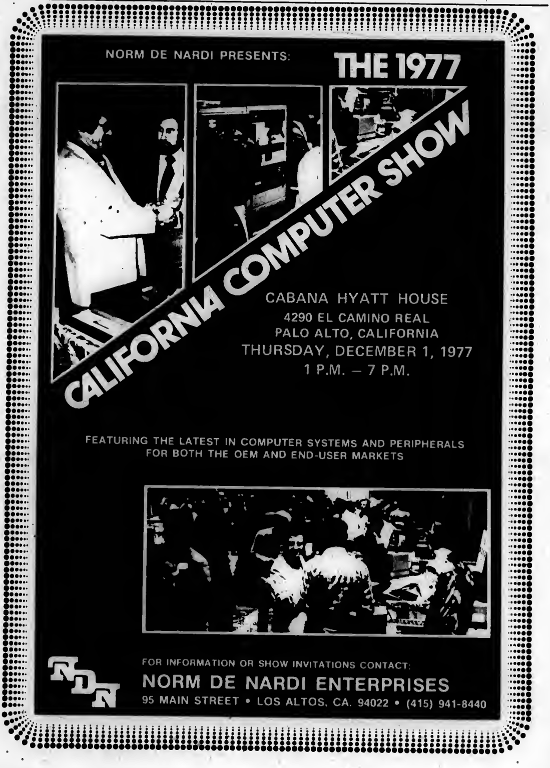
LSI-11
PERIPHERALS

300 LPM Printer
LSI 11 controller and cable
$7800

10 Megabyte Disk
LSI 11 controller and cable
$8900

100 PLUS CORP.
701 Trinity Street
So. Plainfield, N.J. 07080
Phone: (201) 753-4460

LSI II, PDP and DEC are registered trademarks of Digital Equipment Corporation.


NORM DE NARDI PRESENTS:
THE 1977
CALIFORNIA COMPUTER SHOW

CABANA HYATT HOUSE
4290 EL CAMINO REAL
PALO ALTO, CALIFORNIA
THURSDAY, DECEMBER 1, 1977
1 P.M. — 7 P.M.

FEATURING THE LATEST IN COMPUTER SYSTEMS AND PERIPHERALS
FOR BOTH THE OEM AND END-USER MARKETS

FOR INFORMATION OR SHOW INVITATIONS CONTACT:
NORM DE NARDI ENTERPRISES
95 MAIN STREET • LOS ALTOS, CA. 94022 • (415) 941-8440

Hardware, software, problems, people, pricing, ethics, litigation, communication, macros, minis & micros.

We like to make an issue of it.

Every week.

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY
797 WASHINGTON STREET NEWTON MASSACHUSETTS 02160 • TELEPHONE (617) 965-5800

OEM America Meets
at the Invitational Computer Conferences

In Boston ... in Houston ... in Orange County, and in six other cities, OEM decision-makers meet the country's top computer and peripheral manufacturers at the Invitational Computer Conferences — the only seminar/displays designed specifically for the unique requirements of the quantity user.

In one day, at each 1977/78 ICC, guests will receive a concentrated, up-close view of the newest equipment and technology shaping our industry.

Some of the companies which participated in the 1976/77 Series were:

Amcomp, Ball Computer, Braemar Computer, Calcomp, Centronics, Cipher Data, Computer Automation, Computer Operations, Control Data, DEC, DIVA, Data 100, Data Systems Design, Dataflux, Dataram, Diablo Systems, Digi Data, EECO, Florida Data, General Automation, General Instruments, Hazeltine, Hewlett Packard, Honeywell, Houston Instrument, ISS/Sperry Univac, Interdata, Kennedy, Lear Siegler, MDB Systems, Microdata, Mohawk Data Sciences, Monolithic Systems, Omron, PerSci, Pertec, Pioneer Magnetics, Plessey Microsystems, Printronix, Remex, Shugart Associates, Tally, Tandberg Data, Tektronix, Threshold Technology, Tri-Data, Varian Graphics, Wangco, Xylogics.

The Schedule for the 1977/78 Series is:

September 7, 1977 Newton, Mass.
October 4, 1977 Minneapolis, Minn.
October 27, 1977 Palo Alto, CA
November 17, 1977 Houston, Texas
January 19, 1978 Orange County, CA
February 2, 1978 Ft Lauderdale, Fla
March 2, 1978 St Louis, Mo
April 4, 1978 Hasbrouck Heights, N J
April 6, 1978 Valley Forge, PA

Invitational Computer Conferences

Invitations are available from participating companies or the ICC sponsor. For further information contact B J Johnson & Associates, 2503 Eastbluff Drive, #203, Newport Beach, Calif 92660 (714) 644-6037

Rockwell Extends PPS Line

ANAHEIM, Calif — Rockwell International has expanded its line of PPS-4/1 one-chip microcomputers with the PPS-4/1 Model MM76C, which incorporates a programmable high-speed counter/timer.

The P-channel unit can "crunch numbers" or control functions and simultaneously count inputs, events, perform timing and program fixed intervals, among other operations, Rockwell said.

It has five input control lines and 32 I/O ports that include serials I/O capabilities that in combination with an on-chip clock circuit enable it to be directly synchronized with or by another microprocessor system.

The MM76C uses the MM76 instruction set and the same assembler program. The functions of two instructions are redefined to program the 14 different operating modes.

The one-chip microcomputer also contains a 48 by 4-bit random-access memory and a 640 by 8-bit read-only memory, Rockwell said.

The Rockwell PPS-4/1 MM76C is priced at $3.90 each for a minimum quantity of 1,000. In large quantities, prices drop to less than $3.

Rockwell is at 3310 Miraloma Ave., P.O. Box 3669, Anaheim, Calif. 92803.

National Unveils RAM-I/O Chip

SANTA CLARA, Calif. — National Semiconductor Corp. has developed a combined random-access memory (RAM) and I/O chip designed for low-end systems that may require relatively small memory but need a number of peripheral interfaces.

The INS8154, an n-channel, 40-pin circuit, contains 128 8-bit words of static RAM and two 8-bit parallel I/O ports that are bit-programmable, the firm said.

Each I/O pin may be defined as either input or output.

The circuit interfaces directly with SC/MP II, INS8080A and other National Semi microprocessors, the firm said.

The INS8154 costs $8.75 in plastic in lots of 100 or more from National Semiconductor Corp. at 2900 Semiconductor Drive, Santa Clara, Calif. 95051.

Microcosm

MMI Offers 8K ROMs With 55 Nsec Access

SUNNYVALE, Calif — Monolithic Memories, Inc. (MMI) has 8K bipolar read-only memories (ROM) with a 55 nsec access time priced at $10 each in volume. The first time masking charge is $750 per pattern in minimum quantities of 100.

The three versions are 20-, 22- and 24-pin packages, all designed as replacements for other vendors' memories.

MMI is at 1165 E. Arques Ave., Sunnyvale, Calif. 94086.

Synertek's 32K ROM Has 450 Nsec Access

SANTA CLARA, Calif. — Synertek has introduced a 32K read-only memory (ROM), the SY2332, which it said features an access time of 450 nsec.

The SY2332 is organized as 4K words by 8 bits, requires a single 5V power supply and is completely TTL compatible, the firm said.

Available in either ceramic or plastic 24-pin packages, it costs $35 each in quantities of 100 to 999. There is a one-time tooling fee of $750 to $1,000.

Synertek may be reached through P.O. Box 552, Santa Clara, Calif. 95052.

Low Cost Card Punch and Card Reader for DEC HP DG IBM Computers

The CCC 1700A Keypunch interface can connect your computer, time-share terminal, or any bit serial communicating device to an IBM 129 or 029 Keypunch so it will both punch *and* read data cards! It's EIA compatible, converts ASCII or any bit serial code to Hollerith when punching, converts Hollerith to ASCII or any bit serial code when reading, and permits the efficient transfer of data through a 900 character buffer. The 1700A operates at all standard baud rates from 110 to 9600. And it requires no special software drivers; standard Basic or Fortran "PRINT" or "WRITE" statements work just fine!

COMMUNITY COMPUTER CORPORATION
185 West School House Lane • Philadelphia, PA 19144 • (215) VI 9-1200

POSITION ANNOUNCEMENTS

DIRECTOR SYSTEMS MANAGEMENT

We have an immediate opening for exceptional individual to assume responsibility for the Systems Management Department in a 620-bed, acute care hospital. Involves planning, designing and updating of existing business and clinical computer systems. The successful candidate must have management experience in a data processing environment, proven technical competence and the ability to communicate effectively with administrative and medical personnel. Hospital and management engineering experience and a college degree are desirable but not required. Please send resume including salary history in confidence to:

Darrell M. Walters
Employment Maneger
St. Luke's Methodist Hospital
1026 A Avenue, N.E.
Cedar Rapids, Iowa 52402

Career Positions Systems & Technical

Ten growth positions must be filled immediately Openings include systems and marketing reps, senior and branch technical advisors, for a major national manufacturer of computer hardware

Salaries range from $12,000 to $33,000 Requirements include experience and / or familiarity with company systems such as Burroughs, Honeywell, Control Data or IBM

Move up with a solid, expanding, and aggressive company Client company will pay fee plus interviewing and moving costs In professional confidence, mail your resume now, or call Jeff Holmes 417/883-1212

dorsey love & associates inc.
P O Box 4486 G S
Springfield MO 65804

EDP/TC Training Specialist

This challenging position provides an unusual opportunity to combina EDP end training knowladge to contribute to the growth and affectiveness of our national health cara talecommunications system. Major responsibilities include davelopment and instruction of EDP/TC relatad education treining progrems.

Requirements include et laast 3-5 yeers deta processing activity in telecommunications systems, plus 2 years classroom type training experienca in business. Excalaint oral end human reletions skills are e must. A college degrea and training program developmant axpariance are highly desirabla.

We ere haadquertered in downtown Chicago and offar en axcellent salary and outstanding compeny paid benefits. Send resume including salary history, in complete confidence, to:

Roberta M. Teillon
Blue Cross Association
500 N. Michigan Ave.
Chicago, Ill. 60611

Equal OpportunityEmployer M/F

We're Looking for Innovators who are Seeking New Horizons in Telecommunications!

Because those horizons have an infinite number of opportunities for technical accomplishment. We are doing research and development for the communications systems of the future.

CALL TOLL FREE

(800) 323-1966

In Illinois (800) 942-0491
Monday thru Friday from 8 am to 5 pm cst

There probably has never been such a massive new markat for computer-controlled syatems, GTE Automatic Electric supplies systems for both domestic and foreign cuatomers, end telecommunications is one of the industries that ia both basic and vital to every nation in the world. Let us tell you more about the vast growth potential, and of our unique position in the market.

SOFTWARE DESIGN ENGINEER

Responsible for the specification, design and testing of telephone systems support software, network and control software, or maintenance and diagnostics software Prefer a minimum of 3 yeara' experience in structured design, coding, testing and documantation of programs; development with large data base on multi-file computers and real-time systems, HIPO design documentation, TSO usage and software simuletion techniques. Requires e BS or MS in Computer Science or Electrical Engineering and specialized study in the use of PL/1, Fortran, Assembler, Intel 8080 and PDP-11 programming langueges

DATA BASE DESIGN

This position requires a minimum of 5 years' experience in the planning development, design and implementation of deta base software, including data base management systems administration. Your primary responsibilities will be the development of data base system for a large on-going project including the implamentation, support and administration of systems

TELETRAFFIC & PLANNING ENGINEER

Responaible for the analysis of teletraffic probability and queuing problems on digital and analog switching systems and the development of computer programs for switching systems Perform control and route reliability studies, define and analyze problems for future systems features end their applications. Prefer a minimum of 3 years' experience in real-time control systems teletraffic problems, systems equipment quantities specification, and exposure to switching system specifications. Requires a BS or MS in Electricel Engineering, Computer Science or Math and a strong statistical background and experience in PL/1 or Fortran programming and model simulation.

MINI-COMPUTER PROGRAMMERS

We have specific assignmenta aveilable on project development teams responsible for the design implementation of various telecommunication processing systems utilizing mini-computers as the processing element Responsibilities will include the developmant of software programs for real-tima operating systems as well as unique hardware elements incorporated into the systems.

If unable to call, send resuma including recant salary history to:

Menager of Technical Employment, Dept. 471 A6

GTE AUTOMATIC ELECTRIC LABORATORIES
400 N Wolf Road
Northleke, IL 60164

An Equal Opportunity Employer M/F

Data General Needs: Senior Software Specialists.

If the time has come for you to put your career on a path with virtually unlimited possibilities for professional development, then your time has come for Data General. Our growth in terms of new product proliferation, revenues, facilities and manpower literally sets the pace in the small computer industry. Our salaries, benefits and advancement opportunities are established industry leaders.

The positions listed below are available in Westboro, one of our R & D centers and our Corporate Headquarters. We are surrounded by forested hillsides, with mountains to the west and north and the sea to the east. Westboro is less than an hour from the educational, religious and cultural capitol of the U.S. — Boston.

These positions exist in a creative environment where meaningful challenge and reward can be key elements in your future.

Terminal Development

This position requires a creative programmer who will work with engineers in the development of microprocessor based state-of-the-art terminals. In addition to designing software, this person will be expected to contribute architecture concepts that will maximize software performance. Requires experience in assembly language programming, preferably in a variety of microprocessors. Should have experience in product development.

Commercial System Programmers

These positions involve system programming for Data General's new and extremely well-received CS product line, with emphasis on advanced utility development. These professionals must be willing and capable of undertaking assignments in a variety of areas with a readiness to assume group leadership responsibility. These positions require a BS or MS in CS, EE, Math or Physics with emphasis on computer engineering. Requires small computer assembly language programming experience, with DG NOVA experience very desirable. Knowledge of COBOL would be useful.

Diagnostic Engineering-Programming

These rewarding positions represent a few of many new opportunities in our ever expanding Corporate Diagnostics Department. Our great emphasis on vertical integration creates an unending stream of new career opportunities in this field. You may choose one of several paths of project expansion and personal advancement. You will design, code and document diagnostic software. You will be expected to write, coordinate and execute project test plans with complete responsibility for diagnostic testing projects.

Openings are available in:

Systems Diagnostics
Disc Peripheral Diagnostics
CPU, Memory and Floating Point Processor Diagnostics
Communications, SDLC Diagnostics

These positions require a BS or MS in EE or CS with 5-10 years experience in assembly language and/or microcoding plus a hardware background.

If one of these positions could be a logical next step in your career, send your resume in strict confidence to: Jim Kiinbrough, Technical Personnel Representative, Data General Corp., 15 Turnpike Road, Westboro, MA 01581. Or call: (800) 225-7347, ext. 5773 outside Mass.; (617) 485-9202, ext. 5773 in Mass.

Data General

An equal opportunity employer M/F

PROGRAMMER ENGINEER

CONRAC-SYSTEMS-EAST DIVISION

continues its growth in the development of sophisticated electronics . . . the XXI Olympiad and other Scoreboards, devices for the Space Shuttle, etc.

We are currently seeking a well-qualified Programmer Engineer. Successful candidate should have 3-5 years experience with scientific assembly language and Fortran programming (also exposure to top down structured techniques). Ability to work with Engineering staff in formulating programs based on engineering and systems requirements is essential. Will develop innovative aircraft monitoring systems on sophisticated, real-time distributed micro-computer network.

We offer attractive compensation and a comprehensive benefits package. Suburban location only 25 minutes from mid-Manhattan. For consideration, please send resume with earnings history to: RALPH HOLTERMANN

CONRAC
Systems-East Division
CONRAC CORPORATION

32 FAIRFIELD PLACE
WEST CALDWELL
NEW JERSEY 07006

An Equal Opportunity Employer M/F

CSC

PROGRAMMER ANALYSTS

AT CSC's SYSTEM SCIENCES DIVISION

YOUR OPTIONS ARE GREATER...

With a staff of over 8,500 computer professionals, CSC is growing and increasing our lead in the information sciences industry.

CSC's System Sciences Division is calling on your skill in scientific programming and analysis to handle complex assignments in simulation modeling and related areas.

With a Bachelor's or advanced degree in Computer Science, Math, Physics or Engineering and experience using FORTRAN or Assembly language on large-scale and mini-computers, you may be qualified to enhance your professional career within our Division.

Opportunities include distributive network systems, data base management, real-time satellite command and communication systems, real-time operating systems, shared resource systems for spacecraft operations, software quality assurance, and 360/370 OS systems programming.

These projects are in support of our Space Tracking Data Network, Goddard Real-Time Systems and On/Off Site Projects with the NASA Goddard Space Flight Center in suburban Washington, D.C.

For immediate consideration, please send resume or call:

Staffing Department
Toll Free: (800) 638-0842
OR Call Collect: (301) 589-1545

COMPUTER SCIENCES CORPORATION

Systems Sciences Division
8728 Colesville Road
Silver Spring, Maryland 20910

Major Offices And Facilities Throughout The World
An equal opportunity employer

Hewlett-Packard 3000

Senior Analyst/Programmer Analyst

This major chemical manufacturing corporation is seeking two professionals to develop and install systems in an on-line multi-terminal minicomputer environment at our plant near Baton Rouge, Louisiana. Hardware will be HP 3000 Series II using COBOL, SPL, and Image Data Base.

The Senior Analyst will operate as the project leader of a small team and assume total responsibility for the installation, start-up, and continuing support of a large HP 3000 minicomputer system. Initial development effort will be in Inventory and Purchasing areas.

Requirements include a related degree and 2-3 years minicomputer experience, HP 3000 preferred.

Salary will be commensurate with qualifications. For confidential consideration forward resume including salary history to:

Department AJC

BASF Wyandotte Corporation
P.O. Box 181
100 Cherry Hill Road
Parsippany, New Jersey 07054

An affirmative action employer M/F

BASF

FIELD SERVICE

SYSTEMS	370/360, H-200, XDS, Univac, CDC All Large & Medium CPU's
MINI's	PDP, NOVA, G.A., HP, etc. All Mini Systems
I/O	STC, TELEX, CDC, ITEL, CALCOMP, etc. All Peripheral Experience

MTTR

(312) 547-8882

MTTR ASSOCIATES
1107 Mannheim Road $12-30K
Westchester, Ill. 60153
Field Service Specialist
Nationwide Placement
Private Employment Agency
No Fees To Applicants

OVERSEAS ASSIGNMENT

DATA PROCESSING MANAGER

We are a worldwide leader in the marine engineering and construction industry offering a challenging managerial position in Dubai United Arab Emirates.

Bachelor degree preferably in accounting or computer science and 6 years experience with project management responsibility in a variety of application area including accounting and finance.

Should be familiar with DOS/VS operating systems in an on-line environment, IBM 135/138, teleprocessing and Cobol.

Position offers excellent salary, family status, overseas premium and fringe benefits package. Please submit resume, including salary history, in confidence to: W.J. Buckley.

OCEANIC CONTRACTORS, INC.
Subsidiary of J.McDermott & Co., Inc.
P.O. Box 61961
New Orleans, LA 70161
Equal Opportunity Employer M/F

SYSTEMS PROGRAMMER

Immediate opportunity for IBM DOS-VS-CICS systems programmer. Candidates need 2 years experience in CICS. Will bring up new 370 in financial data center located in Huntington, W.Va. Prior financial experience helpful. Send work history, experience, salary history and availability to: Fred Neville, Personnel Director, The First Huntington National Bank, P.O. Box 179, Huntington, West Virginia 25707

SAN FRANCISCO

Our client (Major Calif. Bank) needs Systems Analysts/Systems Programmers for S.F. and L.A. locations. Comp. 20-26K. Following experience is of interest: MIS Design, IMS, MICR, OS/MVT, MVS/JES III, ASP, Hdw/Software evaluation, Planning, and forecasting, and MBA. Reply in confidence to:

Tinman Walker & Co.
Executive Search Consultants
P.O. Box 707
Belvedere, CA 94920

Salem State College
Salem, Mass. 01970

DIRECTOR COMPUTER SYSTEMS

(Reopened)

Experienced systems-oriented administrator to direct all phases of computer services, including operations, programming and systems analysis. Salem State College has on site a CDC System 17 microprocessor that functions as a remote batch entry station on the Mass. State College Computer Network (dual Cyber 72's) operating under NOS/BE 1.

Requirements include a proven track record of capable administration of a computer operation, working knowledge of COBOL and Fortran (COMPASS would be helpful) and extensive experience in systems analysis. Masters degree in Computer Science or related area desirable.

Salary is $19,562 to $28,527 depending upon experience and qualifications. Apply by November 21, 1977, to Director Computer Systems, c/o Affirmative Action.

SSC is an equal opportunity employer

DIRECTOR COMPUTER OPERATIONS

$32K - $36K
Profit Center Compensation

Our client, a manufacturer and distributor located in the beautiful Pacific Northwest, has retained us to find a business oriented Computer Operations Manager capable of directing and managing a large and highly advanced EDP organization.

Current experience in a large IBM mainframe and multi-vendor environment is preferred. Management, motivation and delegative skills will be the essential candidate criteria. All inquiries will be considered in absolute confidence.

Houser, Martin, Morris & Assoc.
(206) 455-9800
1621-114th S.E., Suite 219,
Bellevue, WA 98004

Engineers

You can get ahead faster with us than with anybody else. Here's why:

1 You are needed right now. Our project teams are crying for good professionals who can grab hold fast.

2 You'll get a chance to prove how good you are. Everybody is evaluated regularly; there are no missing persons at TI. If you're good, you move up fast. No matter how long the people above you have been there.

3 You'll be involved in state-of-the-art projects. Advanced airport and airborne radars. New infrared and laser electronics applications. TI is the technological leader in literally scores of product fields. This leadership has produced more than 7,000 patents.

4 You'll work on a complete system. No threat of getting locked into a repetitious specialty. You'll work on a small project team. You'll interface daily with other disciplines and other phases of your overall program.

5 You'll work in a job-stable, multi-market situation. We have a variety of products and markets. We're not heavily dependent on any one of them—and neither is your job.

Live in Dallas. The Southwest's largest and liveliest metropolitan area.

Discover all the glitter and glamour, spectacular sport and high fashion Dallas is famous for—yet an economical place to make a home. Cost of living is way below the urban U.S. average. And there's no state income tax. The country's 8th largest city has year-round sunshine plus lots of lakes and facilities to enjoy it. The area has 34 colleges, 102 major medical facilities, and a wealth of major media and entertainment.

Openings also in Ridgecrest, California.

All openings require a minimum of a Bachelor's degree and U.S. citizenship.

Software Engineers

Application and Assembly language programmers are needed for implementing control, signal processing, and autopilot algorithms.

RF Engineers

Engineers required in all microwave disciplines including antennas, receivers and microwave components.

Field Engineers

Will support evaluation testing of weapon systems and subsystems. Specialized experience in software/hardware design or microwave useful.

Design Engineers

Openings for all disciplines including:

- Mechanical/Structural
- Analog
- Digital

System Engineers

Will provide conceptual design definition for a wide variety of systems and subsystems.

Analysts

System analysts to work with system engineers in trade-off analysis to support system concept and definition.

Send your resume in confidence to: Staffing Manager/P. O. Box 6015, M.S. 222/Dept. C/Dallas, TX 75222.

TEXAS INSTRUMENTS
INCORPORATED

An equal opportunity employer M/F

SOFTWARE SALES REPRESENTATIVE

If you're a self-starter, highly motivated, and have sales experience in financial software, then we've got an offer you can't refuse.

The fringe benefits are excellent, not to mention the opportunity to live in Florida, plus you'll have the distinction of working with the nation's largest supplier of automated financial systems.

Please send resume in confidence to Florida Software Services, Inc., P.O. Box 2269, Orlando, Florida 32802.

PROGRAMMER ANALYST

Under general direction will program applications in administrative and business areas. Must be able to interface with users and develop updated computer systems. A minimum of 2 years practical experience using ANS COBOL essential. Knowledge of on-line systems helpful. Will train.

Call or write:

Mr. Peterson
Illinois Institute of Technology
3300 S. Federal
Chicago, IL 60616
(312) 567-3318

TECHNICAL PLANNER

Experienced individual sought to join progressive and innovative computer firm as a Technical Planner for our future hardware needs. Qualified candidate must have experienced monitoring performance of IBM 360 or 370's under O/S, also experience with 158 under VS and IMS-VS preferred. Interested individuals should call collect or write:

GERRY WOLTMAN
DIRECTOR, TECHNICAL PLANNING
FIRST COMPUTER SERVICES, INC.
CHARLOTTE, N.C. 28208
(704) 374-6447

COME TO TEXAS

Salaries are higher, schools are better... and the living is great!

No state personal income tax/Low property taxes/Lowest housing costs of top 10 major metropolitan areas/Enjoy outdoor activities year 'round

Come join E-SYSTEMS. We are a $320 million international organization, supplying innovative, sophisticated systems to solve a multitude of problems. Our customers include defense and non-defense agencies of national governments, local governments, and commercial businesses. Check over this challenging and career-oriented position and send me your resume today.

Software Engineers

We're looking for good Software Engineers who can make contributions or who are willing to be trained to our ongoing programs. If you are an EW/Surveillance Systems Engineer with a strong interest in software development...or if you are a Software Engineering Expert experienced in the EW and Surveillance areas, opportunities for technical growth and a bright future may be yours at E-Systems.

Our in-house training program will help you broaden your software skills while you are engaged in product development.

There's no doubt that you can live a better life in the Dallas area. You and your family will have unlimited opportunities to learn in our nationally acclaimed school systems. You'll enjoy cheering our high school, college and professional teams, visiting our theme parks and 31 lakes. You'll find a relaxed atmosphere which reflects the positive spirit of our people, and a lifestyle that combines year 'round outdoor activities with diversified cultural events. Yes, bring your family to Texas...where Western friendliness blends with Southern hospitality.

E-SYSTEMS
Garland Division
An equal opportunity M/F employer

Mail your qualifications to:
Bob Martin, Dept. 100-CW
E-SYSTEMS, INC.
P. O. Box 6118
Dallas, Texas 75222

RAYTHEON

Santa Barbara ,California

Raytheon Electromagnetic Systems Division, located in the beautiful Santa Barbara California area, has immediate openings in the following areas:

SYSTEMS ENGINEERS

Define NTDS/EW interface requirements and design and develop associated software. Design and develop diagnostic software for a large scale military EW-system. Requires BSEE or Computer Science degree with experience in real time development and FORTRAN programming.

SOFTWARE ENGINEERS

Perform sub-system design and analysis of computer controlled ESM/ECM systems. Will be responsible for development of system error budgets and analysis of system performance. Requires coordination with design groups.

Please send resume with salary history to:
Employment Office Dept. CW

RAYTHEON
Electromagnetic Systems Division
6380 Hollister Ave. Goleta, CA 93017
Equal Opportunity Employer M/F
U.S. Citizenship Required

PROJECT LEADER DIAGNOSTICS

$22 - 30,000

Our client is a technological and marketplace leader that has achieved a high rate of profitable growth through sound management and successful development of computer systems. We have been requested by them to make a special effort to fill this critical position.

They seek an individual who has the capability to direct a small highly skilled group of diagnostic programmers involved in several projects. A B.S.E.E. or C.S. with strengths in Assembly and or higher level language is required. An advanced degree is preferred. Specific knowledge of fault isolation diagnostics, software performance/measurement tools, synthetic workloads and remote terminal emulation is important.

To be considered for this management position or as an individual contributor to this growing department, contact Ted Chalonar, Steve Ford or Dennis Fitzgerald at (617) 426-4180 or submit your resume to us. All responses will be treated with the highest confidentiality. Please include salary when submitting resume.

ROGERS,& SANDS

100 Federal Street, Boston, MA 02110
Member of Mass. Professional Placement Consultants

FOCUS ON Incoterm

For the solutions to your career questions. Incoterm is a dynamic, innovative, creative company flourishing in a tough market. The people who join Incoterm are dynamic, innovative, creative and enjoy the challenge of a fast-paced company thriving in a fast-paced industry.

Systems Programmers

Exciting state-of-the-art development opportunities are available for systems programmers who want in-depth insight into the workings of our systems. Areas in which you will be involved are: cross assembler development, macro-processor development and, the general development and enhancement of Programming Development Systems. These positions require a minimum of 3-5 years system experience and familiarity with the PDP-11 70. Exposure to the UNIX Operating System is highly desirable.

Senior Software Writer

This is a ground-floor opportunity to start the preparation of documentation during the development stage! In the beginning, the successful candidate will assist in the development of internal specifications and other documents for an advanced computer system development. Required qualifications include experience in software oriented technical writing.

Applications Programmers.

Real-time assembly language programmers with mini-computer experience, and ability to interface well with other people, needed to develop customer software for our users on our Intelligent Terminal Systems. Applications include Banking Systems, Data Entry, Airline Reservations and other similar real-time terminal applications. You should have a minimum of 3 years of experience.

Diagnostic Programmers

Your contribution to Incoterm will be to provide quality software support in development of off-line and on-line diagnostic test programs. Your background must include experience in a similar capacity.

Firmware Coder

If you are a super-competent, intelligent person who strives for perfection, have both hardware and software knowledge and ability, and are becoming interested in programming, you will probably enjoy the position we have available coding firmware, i.e. the ROM state machine, for a new central processor. Direct experience is less important than overall knowledge of what we are trying to accomplish. BSEE preferred.

You'll be happy at Incoterm... a people-oriented company in the forefront of the industry. We'd like to hear from you.

Please send resume to: F. **Joseph Dugan**, Manager, Employee Resources

If absolute privacy is essential please call Mr. Dugan at 237-2100 between the hours of 5 pm and 6 pm
Confidentiality is assured.

INCOTERM
CORPORATION
the international computer terminals people
65 Walnut Street, Wellesley Hills, MA 02181
an equal opportunity employer m f

FLORIDA

SYS PROG
OS/VSP, HASP or JES2, JCL, SYSGEN, PTF's required. MVS conversion, IMS, 3704/5 emul. desired. URGENT! To 24K

SYS PROG
OS/VS Int. & ext., HASP ext., IMS ext., COBOL, ASSEM required. HASP Int., IMS Int. desired. URGENT! To 23K

SYS PROG
DOS/VS, CICS. Min 1 yr. exp. 16K + DOE.

ASSEMBLER
Heavy. To do compiler development. 25K+. DOE.

ASSEMBLER
(2) Min. 1 yr. exp. To 16K. DOE.

PROG/ANAL
NCR. CIF/FOCIS. To 20K.

COBOL
Many, to 16K.

PARTIAL LIST ONLY!

LEN PAYDEN
D.P. Specialist
FRANK LEONARD PERSONNEL
2331 N. State Rd. 7, Suite 124
Ft. Lauderdale, Fla. 33313

Positions Available Nationwide
Call Toll Free

800-426-0342

Assured Confidentiality and Employer Retained.

Mar-Sales Training Prog.	25-35K
Application Progr	15-18K
Systems Analy	17-20K
OS/Cobol Prog	18-20K
Systems Progr	18-22K
IMS Prog/Anal	20-25K

Bill Isgrig

PARKER PAGE ASSOCIATES

P.O. Box 12308
Seattle, Wa. 98111
Offices in Wash. D.C.,
Chicago, Atlanta, Portland, Or.

DATA PROCESSING PERSONNEL

EG&G Idaho, Inc., the prime operating contractor to the Department of Energy at the Idaho National Engineering Laboratory, has immediate openings for:

INVENTORY SYSTEMS ANALYST

BS or equivalent in Computer Science, Accounting, Business Administration or related field. Candidate should have at least 8 years' data processing experience in the development of business oriented automated systems, four of which must be in the area of design and implementation of modern inventory control systems.

SENIOR INVENTORY ADMINISTRATOR

BS or equivalent in Computer Science, Accounting, Business Administration or related field. Candidate should have at least 5 years' experience in the area of modern inventory control and monitoring utilizing EOQ and exponential smoothing techniques.

SYSTEMS ANALYSTS
PROJECT LEADER
SENIOR PROGRAMMERS

Candidates should have a college degree or equivalent, and a minimum of 4 years' experience in the development and implementation of business and management information systems along with proven capability in ANS COBOL. Experience with MARK IV and/or DBMS and knowledge of JCL for DS/MVT is desirable.

Idaho Falls, Idaho is a medium-sized community located close to top-flight winter sports areas. (Sun Valley, Jackson Hole, Grand Targhee) and unexcelled summer recreation areas (Yellowstone, the Salmon and Snake Rivers, the Grand Tetons). If interested and qualified, please submit resume, including salary history and requirements, in confidence to:

TECHNICAL EMPLOYMENT
Department 10

E G & G IDAHO, INC.
P.O. Box 1625, Idaho Falls, Idaho 83401

U.S. Citizenship Required
We are an equal opportunity employer M/F/Handicapped

EG&G

MODCOMP

SOFTWARE DEVELOPMENT OPPORTUNITIES

We are seeking experienced professionals to join us and be a part of our rapid expansion in the booming mini-computer industry. There's never been a better time to consider the outstanding career opportunities with MODCOMP and the good life in sunny Ft Lauderdale, Florida

DIAGNOSTIC PROGRAMMING

Total design and implementation responsibility in the development of diagnostic programs for central processing units, memories and peripheral control units with emphasis on communications and process control. Interact with development engineers throughout the product development phase. Experience in assembly level diagnostics required, microprogramming, microprocessor and digital logic background desirable

OPERATING SYSTEM SOFTWARE DEVELOPMENT

Play a key role in the specification, design and development of real-time operating system components to meet the expanding needs of the mini-computer marketplace as a member of a results-oriented hardware/software development team using state-of-the-art mainframe and peripheral hardware components. Successful candidates for this position must be experienced in the design and/or implementation of operating systems software, have a detailed understanding of computer architecture and be familiar with modern operating system design theory

COMMUNICATIONS SOFTWARE DEVELOPMENT

Responsibilities for this position include the design and implementation of communications software for a family of mini-computer based real-time operating systems including the continued development of remote batch, remote process control and networking systems. Applicants must be experienced in assembly language programming in a mini-computer environment and have a thorough understanding of real-time operating system structures. They must also be experienced with communications hardware and communications protocols such as BYSNC, SDLC and X-25

We offer competitive salaries, substantial fringe benefits and an outstanding opportunity for career growth and advancement.

For further information call or send resume to:
MR. ROBERT COYNER
TOLL FREE 1-800-327-8997

MODULAR COMPUTER SYSTEMS, INC.
1650 West McNab Road
Ft Lauderdale, Fla 33309

An Equal Opportunity
Employer M/F

MODCOMP

COME - GROW AT HARRIS

Searching for your place in the sun?

Today, searching is not always an easy task.

Outstanding talent deserves outstanding growth opportunities. At Harris Computer Systems Division we have both!! We offer YOU the opportunity to match your talent and experience with our opportunities and GROW.

The following are current field and Fort Lauderdale positions which are available for qualified applicants.

SALES MANAGERS & SENIOR SALES

Continuous 100% quota performers in medium and/or large scale computer systems. Track runners with CDC, Univac, Honeywell, DEC or other medium to large scale manufacturers are welcome.

SYSTEMS ANALYSTS

For software development to develop operating systems or compilers. Experience in either area is necessary. Degree plus heavy operating systems or compiler experience.

FIELD MARKETING ANALYSTS

To support field sales in pre and post sales situations. Large mainframe plus COBOL and FORTRAN with operating systems experience. Data base management and time sharing are pluses.

MIS ANALYSTS

For networking, distributed processing and computer aided manufacturing operations. Will develop business applications systems for our Management Information Systems group.

FIELD CUSTOMER ENGINEERS

Will support field installations and must have large or medium CPU and peripheral experience. CDC, Univac or other large mainframers are welcome.

ENGINEERS

Several positions are now available for logic design, packaging or power related engineering. BSME, BSEE or electronic experience is required. Also, industrial engineers for time standards, data base, special projects and systems design automation.

INSTRUCTORS

Hardware or software instructor positions are available for individuals with 3-5 years' experience in either hardware course or software preparation and classroom instruction. Occasional travel is required. We seek candidate with degree in computer science, math or other equivalent.

TECHNICAL WRITERS

Positions available for hardware technical writers with programming experience or software development technical writers with appropriate programming skills as well as writing capabilities.

QUALITY ASSURANCE ENGINEERS

For components reliability checkout and tests. Will evaluate systems and will input management in the areas of specs. Several slots available for experienced digital computer manufacturing QC personnel.

SENIOR CONTRACTS ADMINISTRATOR

To do direct commercial and GSA negotiations and administration. Degree plus experience in capital ticket negotiations or negotiations relative to digital computer systems.

PERSONNEL

Generalist with emphasis in one of three functional areas is preferred; wage and salary, organizational analysis and development, or recruitment. Degree plus 5 years' experience a minimum requirement.

If you are a data processing professional and feel that you would like to make a change with a fast growing Fortune 500 company such as Harris, we would appreciate your taking the time to complete and clip out the information requested below. This will be held in the strictest confidence.

I am interested in ________________
NAME ________________
ADDRESS ________________
CITY ________ STATE ________ ZIP ________

__ Enclosed is my personal resume for your convenience.

Attn: W.D. Taylor, Manager of Employment, Harris Corporation, Computer Systems Division, 1200 Gateway Drive, Fort Lauderdale, Florida 33309

HARRIS
COMMUNICATIONS AND INFORMATION HANDLING

An Equal Opportunity Employer Male and Female

EDP SALES
FIELD SERVICE ENGRS
SYSTEMS ENGINEER
RAY HARRIS

Computers, Peripherals or Software experience. $20-30,000++. Tired of no support, Low commissions & high charge backs? Contact Ray Harris for a top career change!!

LLOYD PERSONNEL

10 Cutter Mill Rd.
Great Neck, N.Y. 11021
(516) 466-6870

21
START-AT-HOME D.P. BUSINESSES

127 page research report uncovers areas never published, plus hundreds of how-to-do-it ideas on moonlighting, starting up, image building, bidding, contracts, failure signals, and much more. A superior career planning tool $12.00 (Check, Mastercharge, Bankamericard) Guaranteed Refundable, to **DATASEARCH INC., Suite 108G, 730 Waukegan Rd., Deerfield, IL 60015. Tel. Orders (312) 945-2940**

Systems Analyst Programmer

Eastern Washington University, near Spokane, has an opening for a Systems Analyst/Programmer with a minimum of two years programming experience, including some systems analysis work, using COBOL. An appropriate degree is preferred, but, experience may be substituted for educational qualifications. Duties include development of design specifications and writing complex program instructions for administrative systems development. Duties will be performed at a State-wide Service Center located on one of the Northwests' most beautiful University campuses. Salary to 18K with excellent fringe benefits. Apply by Nov. 23, 1977 to Personnel Director, Eastern Washington University, Cheney, WA 99004. An Equal Opportunity Employer, (M/F).

ANALYZE THESE CAREERS!

Morrison-Knudsen Company, Inc. Boise home office is currently seeking the following qualified individuals:

★ SYSTEMS ANALYSTS

Candidates should have a minimum of 5 years experience in programming and a minimum of 3 years Systems Analysis/Design. Baccalaureate or advanced degree in Computer Science is required. Responsibilities would include the design and maintenance of highly specialized commercial and engineering application systems. Exposure to distributed information processing utilizing mini-computers and general knowledge of telecommunications would be an asset. Successful candidates must be flexible and willing to relocate.

★ PROGRAMMER/ANALYSTS

Candidates should have a minimum of 2 years commercial or engineering applications programming experience and a minimum of 1 years' exposure to application system design. BS/BA degree in Computer Science or any field with demonstrated exposure to computers and data processing is required. Responsibilities would include application system design, programming, installation and post-installation support for standard domestic and international field data processing systems. Knowledge of any one or all of the following: FORTRAN, COBOL, BASIC, APL, and/or Machine Language. Exposure to major operating systems software and JCL. Experience in programming WANG 2200 series computers and in distributed processing, telecommunications interface to IBM Systems/370, OS environment would be an asset. Successful candidates must be flexible and willing to travel.

★ PROGRAMMER/ANALYSTS

Candidates should have a minimum of 2 years commercial applications programming experience and a minimum of 1 years' exposure to application system design, preferably with Systems/370 in an OS environment, using COBOL language. BBA in Information Sciences or BS in Computer Science is desirable. Mark VI experience is preferred and a knowledge of accounting and financial applications is a definite asset.

★ PROGRAMMER/ANALYSTS

Candidates should have a minimum of 2 years experience in the Timeshare/RJE/Telecommunications field with major effort directed towards support and development of timeshare systems. Timeshare experience desired in CMS or TSO. Solid technical ability in NCSS, Informatics or TYMSHARE systems acceptable with additional knowledge of other timeshare systems. Required languages include PLI, FORTRAN. Secondary knowledge in Assembler, BASIC, APL and COBOL is desired. BS/BA degree preferred. Strong technical work history will be evaluated as a substitute for technical degree.

Morrison-Knudsen offers competitive salaries, liberal fringe benefits and an excellent location. Interested applicants should request an application from:

Leslie Rasmussen, Personnel Department, Dept. 14.
MORRISON-KNUDSEN COMPANY, INC.
Box 7808
Boise, Idaho 83729
(800-635-5970 Toll Free)

M-K is an equal opportunity employer M/F

"SUNBELT CAREERS"

Group Leader Degree + 3 yrs IMS systems & mgmt exp	To $30,000
Project Leader Degree +5 yrs OS/MFG systems exp	To $28,000
Software 3 yrs DOS/VS/CICS software exp	To $24,000
Sr. Programmer Degree +4 yrs COBOL/CICS exp	To $20,000
Programmer/Analyst 2+ yrs, DL/1/OS or DOS exp	To $18,000
Programmer (Need 10) 1+ yr COBOL or RPG11 exp	To $15,000

Client co pays all employment expenses. Contact in conf, J. Schwab, (704) 527-4980.

FOX MORRIS
PERSONNEL
CONSULTANTS
4000 Park Road
Charlotte, NC 28209
EDP Professionals

EDP OPPORTUNITIES

Mark IV Cnslnt-development	$23K
IMS PL-1-degree	$21K
EDP Audit Mgr-Fort 100 co	$31K
Acctg Applicants Programmer-degr.	$21K
Analysis/Programming-hvy user contact 370 DOS/OS Cobol	$20K
Econometric Modeling T/S bldg.	$25-30K
Biz Cnsltnt-Fort co 35% Int'l trvl	$25-32K
Proj Ldr Systems Progr-HASP CICS SVS	$25-28K
CICS DOS/VS COBOL-degree	$19-21K
UNIVAC 1140 Fortran/Assembler ALP	$19-23K
JR Software Mark IV	$15K
CICS VS 1-TSO VSAM-degr	$20-23K
BAL DOS A/R or G/L	$17-19K

Bill Borrelli
(212) 349-3610
William Harris Assoc
150 Broadway agency NY 10038

SYSTEMS SPECIALIST

skilled in computer programming and experienced in writing technical reports to work in federally-funded project in growing community college. Apply by Nov. 21, 1977 to: Personnel Office, Parkersburg Community College, Rt. 5, Box 167-A, Parkersburg, W.VA 26101.

An Equal Employment/Affirmative Action Employer in the Mid-Ohio Valley.

PROGRAMMER/ ANALYST:

Three positions available. Primary area of responsibility will be implementing administrative applications on DEC1080. COBOL required. DBMS-10 experience highly desirable. Salary based on experience. For additional information you may call David Senn, (502) 588-6618 collect. Send resume and salary history to: Ms. Betty W. Miles, Personnel Office, University of Louisville, Louisville, KY 40208

An Equal Opportunity Employer

PROGRAMMERS

If you are a programmer, programmer/analyst or systems analyst and would like the most individualized job search offered in the data processing field today, send your resume in confidence to:

DALLAS
SEARCH E.D.P., INC.
13773 N. CENTRAL EXPWY
SUITE 1305
DALLAS, TEXAS 75243

CINCINNATI
SEARCH E.D.P., INC.
SUITE 25.
3181 LINWOOD AVE.
CINCINNATI, OHIO 45208

HARTFORD
E.D.P. SEARCH, INC.
P.O. BOX 331
HARTFORD, CONN. 06191

SYSTEMS ANALYST COBOL PROGRAMMERS

Ethyl Corporation, a Fortune 500 company (194), has openings for a qualified systems analyst and for experienced Cobol programmers. All candidates must be degreed with an MBA preferable.

- Candidates for the analyst position must have a minimum of 3-6 years experience in the design (not programming) of EDP systems with concentration on manufacturing or accounting applications. The successful candidate will be involved in heavy systems design, interaction with users, economic evaluation of alternative proposals and development of programming specifications, all under limited supervision.
- Candidates for the programmer positions must have a minimum of 1-3 years experience as a COBOL programmer in a batch oriented business environment.

Ethyl Corporation is a major manufacturer of petroleum and industrial chemicals, plastics, and aluminum products with the centralized Corporate Data Center in Baton Rouge serving domestic and international sales and manufacturing facilities. The data center features a 370/155, 360/50 configuration operating under OS-MVT, HASP. Excellant salary and benefits program. Send resume, salary history and references to:

ETHYL CORPORATION
Mr. J.M. Klopf
451 Florida Blvd.
Baton Rouge, LA 70801
An Equal Opportunity Employer

ANALYST/ PROGRAMMER

Thilmany, a leader in the packaging, specialty papers field, has an immediate opportunity for an aggressive, results-oriented Analyst/Programmer to assume system design responsibilities in our Systems and Programming Group.

Our ideal candidate has a strong background in COBOL programming, 2 years on-line system design, with CICS & DL/1 a plus, and/or exposure to 3790. B.S. degree highly desirable.

We offer an opportunity for professional growth in a high quality of life area, plus competitive salary-fringe benefit package. Respond to: M.B. Maudsley

Thilmany

THILMANY PULP & PAPER CO
Division of Hammermill Paper Co
KAUKAUNA, WISCONSIN 54130
An Equal Opportunity Employer M/F

COMPUTER SCIENCE PROFESSIONALS
CAREER OPPORTUNITIES

Rexham Corporation, a Charlotte North Carolina based NYSE listed results-oriented manufacturing company with multiple divisions on-line is seeking professionals to work in our data processing department. A recently centralized data center with upgraded equipment and enlarged scope offers a major challenge in applications programming and in computer operations. On-line, realtime information systems will be developed for remote manufacturing facilities on a Univac 90/60 using VS/9.

SENIOR PROGRAMMER/ANALYST

A strong technical position offering opportunity to develop applications using ANS COBOL interactively. This individual will carry projects all the way from concept and user interface through design, coding, testing and implementation.

REQUIREMENTS:

- 5 years hands-on experience in business applications programming using ANS COBOL.
- Bachelors degree in Math or Engineering essential (Master's in Computer Science a plus).
- Heavy experience in design and analysis of major systems plus strength in JCL.
- Prior experience in development of financial systems a plus.

MANAGER-COMPUTER OPERATIONS

Positions offers an excellent opportunity to direct this production function with substantial user and management interface. Requires hands-on experience in operation of virtual memory systems serving multiple users concurrently.

REQUIREMENTS:

- 3 years solid, hands-on experience in computer operations on medium to large scale systems.
- Bachelors degree in Math, Engineering, Computer Science or Business Administration.
- Excellent working knowledge of virtual memory operating systems.
- Proven ability to supervise computer operators.

These career openings offer excellent compensation, with liberal benefits. Relocation will be paid to our pleasant Southeastern community, near a metropolitan region. For immediate consideration, please send resume with salary history, in confidence to:

Rexham CORPORATION
P.O. Box 4068, Charlotte, N.C. 28204
Attention: C. Payne
An Equal Opportunity Employer M/F.

Software Product Manager

Intel's newly established and rapidly growing Microcomputer Systems Division has been #1 in microcomputers from the beginning. Because of our explosive growth, we are in need of an aggressive, individual who wants to try new ideas to satisfy software requirements.

To qualify, you should have 2-4 years experience designing and marketing software for minicomputers or microcomputers plus familiarity with the needs and requirements of the OEM market. A BS EE, Computer Science or Math is required with an MBA preferred, plus knowledge of real time operating systems, languages and applications.

If you would like to work for the industry leader in OEM microcomputers, please send your resume to Jerry Hukee, Intel Corporation, 3065 Bowers Avenue, Santa Clara, CA 95051 or call collect at (408) 987-8748. We are an equal opportunity employer M/F.

intel

BUSINESS SYSTEMS ANALYSTS

Telamed Corporation, a leader in the fast growing automated health care industry, has immediate openings for talented, committed professionals to serve as analysts within the Information Systems group. These analysts must have a strong applications background and be able to take a project from start to finish, including definition, design, programming and implementation. Knowledge of COBOL is essential; background in data base systems and experience with the DEC System 10 would be an added plus.

Telemad provides a challenging and stimulating environment for professional growth, with the latest in computer technology and information systems. Business applications development is done on in-house DEC KL-10 Timesharing system, with your own CRT for on-line program development. These positions offer an opportunity to interface with top corporate management and propose solutions to real problems. Salary will be commensurate with your background, experience and potential contribution to the company.

Send your resume or a letter detailing your experience, in complete confidence, to:

Software & Professional Recruitment

TELEMED CORPORATION

2345 PEMBROKE AVENUE
HOFFMAN ESTATES
ILLINOIS 60195

An equal opportunity employer

SOFTWARE MARKETING OPPORTUNITIES

Value Computing, Inc., a proven leader in the development and marketing of D.P. Operations Software Systems, is expanding its marketing force in the Chicago, New Jersey, and New York areas. Two positions are now available to the aggressive, self-motivated, experienced D.P. sales professional.

BRANCH MANAGER

(New York Metro Area)

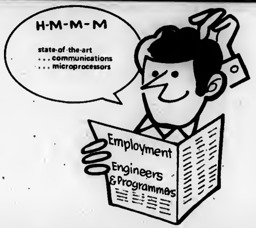
- Knowledge of D.P. Operations Desirable
- Comprehensive Software Product Line Offered
- Large Client Base and Extensive Prospect Lists

MARKETING REPRESENTATIVE

(Chicago and Cherry Hill, N.J.)

- Experience with DOS/VS Environments Highly Desirable
- Moderate Travel within Territory
- Products Include: Disk Space Management, File Independence, Partition Balancer, ISAM Support for 3350's and 3330 Mod II and Tape Library Systems

We are seeking ambitious individuals who will be well compensated for performance (Salary & Commission & Expenses & Bonus). Advancement potential in our dynamic company is excellent. Don't pass up this opportunity to maximize your income. Please immediately send your detailed resume in complete confidence to: Carl Dreyer, Value Computing, Inc., 300 West Merlton Pike, Cherry Hill, N.J. 08002, (609) 429-4200.



After reading all those employment ads why consider NCR's Communication Systems Division in Columbia, South Carolina?

We feel there are 2 compelling reasons:

1) TECHNOLOGY
2) LOCATION

In 1974, the Communication Systems Division was formed to provide the point of concentration for the design and development of products that assure compatibility of our terminals and computers in the communications environment. In addition, CSD also serves as NCR's center for microprocessor development and technology. We develop communications controllers, microprocessor modules, semiconductor memory modules, and their application to terminals and data processing systems

CSD not only offers you a state-of-the-art technical environment, but also a lifestyle which will offer you the best of both worlds. Columbia, which is close to the seashore and mountains, enjoys the lifestyle of both city and country living with fine recreational facilities for tennis, golf, fishing, camping and water sports. The area also has excellent housing opportunities, low taxes, and is the home of the University of South Carolina.

So if you're seeking a technical challenge and a geographical change, your job search may be over We currently seek qualified personnel in the following areas

DESIGN ENGINEERS

- Processor design using MDS or bipolar bit slice devices
- Microprogramming
- Microcmputer diagnostic software
- State-of-the-art semiconductor memory design
- A/D to D/A conversion design
- Linear and digital circuit design
- Working knowledge of Intel 8080

COMPONENT ENGINEERS

- Experience in memories and microprocessors
- Knowledge of characterization and qualification requirements of LSI

MODEM ENGINEERS

- 1200 to 9600 BPS
- Design, application, evaluation and production support
- Microcomputer systems

PROGRAMMERS AND SYSTEMS ANALYSTS (Hardware/Software)

Openings exist in the following technical areas:

- Distributed network architecture
- Systems design
- Simulations
- Operating systems
- Real time systems
- Diagnostics and error recovery
- On-line communications drivers
- SDLC, asynch, bisynch disciplines
- Assembly language experience
- Assemblers, link editors and compiler development

A degree in engineering, math or computer science required. Recent graduates will also be given consideration. For immediate response, please send your resume with salary requirements in complete confidence to:

NCR

Mr. Ken Uhlig
Communication Systems Division
NCR Corporation
3325 Platt Springs Road
West Columbia, S.C. 29169

An Equal Opportunity Employer

COMPUTER PROFESSIONALS:

Come enjoy the good life in San Diego!

Move ahead with one of the world's most successful computer manufacturers while living in one of America's most acclaimed vacation centers. San Diego offers you the climate of your choice, from the cool, mild breezes of the ocean to the constant dry warmth of true desert—and every gradation in between. Create your special lifestyle in a hilltop hacienda, an urban highrise, a country club condominium. Explore mesas and canyons, 70 miles of local beaches and bays, the byways of Baja. Continue your professional education in one of the area's many major colleges and universities, enjoy sports all year, from tennis to whale-watching. NCR—for a good living and a good life.

Immediate openings in these areas

- FIRMWARE
- DIAGNOSTIC PROGRAMMING
- PERFORMANCE MEASUREMENT
  (GPS Simscript Modeling/Simulation)
- SOFTWARE CONFIGURATION MANAGEMENT
  (Design, develop programs to support software testing, release and repair.)
- SOFTWARE DEVELOPMENT
  (Design/implementation of multi-program O/S in a high-level language. Experience desired in data base or telecommunications, distributive processing, virtual machine, time sharing.)
- SOFTWARE QUALITY CONTROL
- MICR APPLICATION SOFTWARE
  (Experience desired in both Transit and Proof of Deposit applications plus features such as CRT Reject-Reentry.)

Employees will enjoy excellent salary and top working conditions with a commercial employer. Fully paid life, hospital and medical plan for employees and dependents, generous relocation allowance.

Please send resume immediately including salary history, training and experience to the Professional Placement Office at the address below

NCR DATA PROCESSING DIVISION
16575 W. Bernardo Drive, San Diego, Calif. 92127
An Equal Opportunity Employer

S R A

EDP $16,000 - $40,000
PROG. - ANALYSTS - MGR. - SALES

Well-known client companies pay our fees. Applicants pay no fees or charges for any of the fine positions listed. Also good opportunities for degreed accounting and marketing professionals.

Mini-Programmer	$20-30K
Systems Programmer	$18-24K
Programmer/Analyst	$18-22K
Sr. Systems Analyst	$22-25K
Micro-Programmer	$1[illegible]-30K
Programmer	$16-18K
Software Designer	$20-35K
Sales Manager	$35-40K
MIS Director	$25-30K
Consultant (BSEE)	$20-28K

Mail Resume or Call Today

MICHIGAN
3001 South State St.
Suite 606
Ann Arbor, Michigan 48104
(313) 994-5632

OHIO
236 East Town St.
Columbus, Ohio 43215
(614) 228-1835

NEW YORK
M&T Bank Building
4455 Transit Rd.
Williamsville, N.Y. 14221
(716) 632-0400

OHIO
400 Ohio One Bldg.
25 E. Boardman St.
Youngstown, Ohio 44503
(216) 744-4361

SOUTH CAROLINA
Jefferson Square Bldg.
1801 Main St.
Columbia, South Carolina 29201
(803) 779-2080

Sanford Rose Associates

Systems & Procedures Analyst

Our Corporate M.I.S. Department in downtown Pittsburgh is seeking an individual to formulate user guides and instruction manuals for computerized systems, establish guidelines for records retention and analyze office procedures and methods.

The successful candidate will have a bachelor's degree in Computer Science or related area, plus a minimum of 2 years experience in systems analysis and/or programming, preferably, in a manufacturing environment. Applicants should be user-oriented and have good technical writing skills.

Please submit resume including salary history to: Supervisor, Salaries Employee Relations.

JOY

JOY Manufacturing Company
1200 Oliver Building
Pittsburgh, PA 15222

An Equal Opportunity Employer M/F

PROGRAMMERS
SOUTHERN CALIFORNIA
Do you speak our language

If so, then program your future with Smith Tool. Our newly constructed facility in the Irvine Industrial Complex in Orange County offers unparalleled opportunity for talented Programmers with a minimum 2 years COBOL experience to become part of our growing installation. Initial assignments will involve new applications for our manufacturing systems. Our current environment consists of a 370/138 DOS/VS utilizing VM/CMS, with a planned conversion to a DL/1.

Smith Tool is a leading manufacturer of rock bits for the petroleum and mining industries. We not only provide competitive salaries and an excellent employee benefits package, but our progressive and innovative management style invites and encourages personal and professional growth. So, if we are speaking your language, bring your talents to Smith Tool, where you will be recognized and rewarded for your contributions.

Please apply to Brian Mathison at:

SMITH Sii SMITH TOOL

Division of Smith International, Inc.
17871 Von Karman Ave. Irvine, CA 92714

Equal Opportunity Employer M/F

PROGRAMMER ANALYST

The Glass Division has an immediate opening for a COBOL Programmer/Analyst with experience in TOTAL and ENVIRON 1 data base.

BS Degree in Computer Science, Mathematics or Business is desirable.

Competitive salary and fringe benefit program.

Candidates meeting these requirements should submit a detailed resume, including educational background, salary history, work experience and salary requirements to:

Ford

Glass Division
Attn: Mr. Roy D. Seifried
Salaried Personnel
P.O. Box 1698
Dearborn, Michigan 48121
An Equal Opportunity Employer

Career Positions Systems & Technical

Ten growth positions must be filled immediately. Openings include systems and marketing reps, senior and branch technical advisors, for a major national manufacturer of computer hardware.

Salaries range from $12,000 to $33,000. Requirements include experience and/or familiarity with company systems such as Burroughs, Honeywell, Control Data, or IBM.

Move up with a solid, expanding, and aggressive company. Client company will pay fee plus interviewing and moving costs. In professional confidence, mail your resume now, or call Jeff Holmes 417/883-1212.

dorsey love & associates inc
P.O. Box 4486, G.S.
Springfield, MO 65804

Systems Consultant

In-house EDP systems consultant opportunity with one of America's largest fraternal life and health insurance societies. Minimum of five years programming and systems analysis experience. Requires executive level communication skills. Central Wisconsin location in family-oriented community. Send resume to:

Employment
Aid Association
for Lutherans
Appleton, WI 54919

INSURANCE SYSTEMS

Education:
BS-Math, Computer Science, Business

Software:
COBOL, ALC, IMS, DOS/OS, CICS, VS

Applications:
CPO, LIFE/70, LIFE-COMM, ALIS, PALIS, Pensions Financial

Environment:
Life, Casualty, Variable Life

Experience:
2 or more yrs. programming, design, consulting, installation, development, project management, systems programming.

Location Desired
New England, Middle Atlantic, Midwest, Southeast, Southwest

Salary Range:
$16,000-$30,000

If your resume could be prepared from the above, call or write Jack Edwards to explore your options. Jack's ONLY speciality is insurance data processing. He is a FLMI and has been in the business for 19 yrs.

Jack Edwards Associates
Suite 600
8150 Leesburg Pike
Vienna, Virginia 22180
(703) 821-0688
Insurance Personnel

Operating Systems Programmer

We have an immediate opening for an Operating Systems Programmer who is experienced in file subsystem and implementation of a general input/output manager. This individual will be responsible for the design, implementation and documentation of the standard input/output manager on the STAR 100 computer. BS/MS in Computer Science or a related discipline and a minimum of 2 years assembly language experience on large scale systems are required. For immediate consideration, send resume to K. Herdy, Dept. 40-A, 215 Moffet Park Drive, Sunnyvale, CA 94806.

CONTROL DATA CORPORATION

An Affirmative Action Employer M/F

SYSTEMS ANALYSTS

The Computing Services Center of Wayne State University has acquired an Amdahl 470/V6 and is presently upgrading it to take advantage of this advanced architecture. You will have the opportunity to work on IBM's VM and MVS and one of the industry's most advanced data base management systems, presently under test. This is a unique opportunity to grow in a sophisticated on-line environment.

Bachelors degree in Computer Science, applied science or related area required. Systems analysis and programming experience desirable. Salary range $15,298 - 19,822.

Send resume and supporting credentials to

Margaret B. Canty
Computing Services Center
5550 Cass Avenue
Wayne State University
Detroit, MI 48202

or call (313) 577-1583 for more information.

WAYNE STATE UNIVERSITY COMPUTING SERVICE CENTER

an affirmative action equal opportunity employer

ROBERT HALF PERSONNEL AGENCIES

of ORANGE

PROGRAMMER ANALYST

An immediate opening exists for a Programmer Analyst. Our client, a major division of a Fortune 200 company in an excellent So. California location requires a minimum of 4 years 370 COBOL. Business applications and knowledge of production payroll also desired. Salary to $20K with excellent fringe benefits. Contact Joe Manella.

800 S. Main
Orange, CA.
(714) 835-4103

of LOS ANGELES

SR. PROGRAMMER ANALYST

A major entertainment industry is seeking a Senior Programmer Analyst with 2+ years 370 COBOL and bal exp. either DOS or OS JCL needed. Some PL1 would be a plus. They will train in CICS and DATABASE. System background should include financial and distribution. Salary to $18K with super fringe benefits. Contact Duncen White.

3500 Wilshire Blvd.
Suite 1814
Los Angeles, CA 90010
(213) 386-6808

of DALLAS

The demand for EDP professionals continues extremely high in the Dallas area. We have immediate openings at all levels .... salary ranges. All fees, interview, and relocation expenses are completely paid for by our client companies. Please rush your letter or resume on a strictly confidential basis to:

Ron Urbach
Two Northpark East
Suite 750
Dallas, TX 75231
(214) 363-3300

of PHOENIX

Prestigious client now has several senior analyst positions within their Corp. Support Group. Considering a wide variety of applications exp. involving Analysis of IBM Data Bases. A good working knowledge of PL1, large IBM 370 operating systems, and JCL are required within this large and sophisticated environment. Co. will pay fee, interview and relocation expenses. For confidential consideration, call or mail your resume to:

Bob Fox
3225 N. Central Ave.
Suite 812
Phoenix, AZ 85012
(602) 264-6488

of HARTFORD

PERFORMANCE ANALYST

New England client expanding IBM/MVS Data Center. Indiv. with hardware/software preferred monitoring background qualifies for excellent long term growth opportunity. Salary is open D.O.E.

Contact Stan Durbas
for details at:
111 Pearl St.
Hartford, Conn. 01803
(203) 278-7170

of NEW YORK

DATA BASE ADMINISTRATOR

Ground floor opportunity to join a fiscal control group of a major New York City financial service organization. IBM 370/158 VS/1 using IMS COBOL. Full responsibility for applications and staffing. Challenging. $27,000. Contact: Peter Smith.

(212) 221-6500
522 Fifth Avenue
New York, N.Y. 10036

of MILWAUKEE

PROGRAMMER/ANALYST

Fine, rapidly-growing manufacturer is looking for a "doer"; experience including COBOL or PL/1, understanding of on-line systems. To $20,000.

777 E. Wisconsin Ave.
Milwaukee, WI 53202
(414) 271-8380

of MICHIGAN

SOUTHFIELD & GRAND RAPIDS

SYSTEMS SPECIALIST

"Blue Chip" firm is aggressively seeking individual with solid success history in systems evaluation, design, and implementation. This is a unique opportunity to become involved in advanced "state of the art" TP DATA BASE. Hi-visibility spot. will interface with senior mgmt. group. Superior fringe package. Start 20-30K plus reloc. Fee Paid.

570 Honeywell Ctr.
Southfield, MI 48075
485 Frye Bldg.
Grand Rapids, MI 49503

of Kansas City

Programmer/Analst	$14-$17K
Project Leader	$18-$22K

Multiple openings exist with K.C. State of the Art installation. All fees and expenses paid.

127 W. 10th
Kansas City, MO 64105
(816) 474-4553
Contact: George Waterman

of HOUSTON

PROG ANALYST-Over 60 AVAIL-IMS a +	15-24K
PDP PROG ANAL-ALC MACRO-OB	18-20K
PROG ANALYST-MSA" Payroll	18K+
OPS ANALYST-Hardware/soft. monitors	15-24K
SYS PROG-Internals + Sys-Gens, ALC	17-19K
SYS ANAL-A/R, A/P G/L, etc	20-22K
PROJ LDER-Refinary MOD, Oil/Gas plan	22-25K
PROJ LDER-Fin Sys/COBOL/ALC/TOTAL	15-22K
MGR S/P-BBA + Fin Sys TOTAL DB	20-23K

Jim Fleming 713-881-3271 4801 Woodway, Suite 231W Houston, Texas 77056

of FLORIDA

P/A Bnking CPCS	16K
P/A Mfg DOS/VS CICS	15K
Anal Constr Univ DMS	22K
P/A TOTAL cobol	16K
Prog Bnking Neat 3	14K
Prog real time PDP	22K
P/A Life ins cobol	17K
Sys Prog CICS IMS	16K
Prog real time sci	22K
Anal IDMS cobol mfg	18K
Prog IMS cobol	19K
P/A 370/OS cobol	16K
Sys Prog IMS DOS/OS	18K
Mgr Mini cbl/basic	24K
Consult Bnkg degree	19K
Prog Banking Burr	14K
P/A Burr DMS II	18K
Anal Data com spec	17K

1311 N. Westshore Blvd.
Tampa, FL 33607
(813) 876-4181

of WASH. /BALTIMORE

DATA BASE ADMIN-Heavy Burroughs exp. DBMS or IDS	$29K
DESIGN ANALYST-State of the arts DS & software devel. Data base and TP must, big Honeywell exp.. a plus.	$24K
PROG/ANAL-COBOL, big IBM musts. IMS, DL1, CICS on 370/158, OS a plus	$20K
SYS ANALYST-To interface with energy oriented users. COBOL, ALC on 370/168	$23.5

7315 Wisc. Ave.
Washington, D.C. 20014
(301) 652-1550
217 Quad.
Baltimore, MD 21210
(301) 323-7770

of ST. LOUIS

COUNTRY LIVING

Firm in mid-state Missouri population 15,000 is looking for a good exp. COBOL Programmer/Analyst with retail bkgd. that wants to live in a small town. Company has 360/50 DOS, going to 370 in the future. Any knowledge of RPGII a plus, also a degree a plus. Salary to $18,000.

7733 Forsythe Blvd.
St. Louis, MO 63105
(314) 727-1838

of BUFFALO

SR. SYSTEMS ANALYST

High visibility position in New York City requires seasoned analyst to travel 15% throughout U.S. to RJE sites. Major responsibility will be to head up team in design and implementation of distribution, marketing and financial applications. Aggressive peer group. 370/138 VM shop. MBA $24,000.

(716) 842-0801
1310 Liberty Bank Bldg.
Buffalo, N.Y. 14202

of IOWA

PROGRAMMER ANALYSTS

Want to learn OS? Client Company converting in mid 1978. Excellent facilities. Will train in on-line and Data Base systems. 2-8 years exp. Salaries 14-18,000. Fee Paid.

Call Ken Allen at
(515) 244-4414
317 6th Avenue
Des Moines, Iowa 50309

of MINNEAPOLIS

SYSTEMS ANALYST

Exceptional opportunity now with a growing suburban mfg. co. offering: 4 day work week, salary to high teens, non-programming, and increasing supervisory responsibility. Co. wants several years COBOL and related qualifying experience. For information on EDP positions at all levels, contact Richard Haney.

(612) 336-5001
2235 IDS Center
Minneapolis, Minn 55402

of BOSTON

PROJECT LEADER/SYSTEMS ANALYST

Creativ indiv. w/min. 3 yr exp. in systems analysis, client interface, COBOL prog. 80% analysis; 20% prog. Profit Sharing & Bonus. Excellent state of the art shop in Boston. To $20,000.

SYSTEMS PROGRAMMER

Excellent growth potential with prominent Boston financial services org. Requires expertise in both Sys. Gen & OS/MVS for IBM 370/168. Multi machine environment. w/progressive state of the art mgmt. Contact: Jim Staunton.

140 Federal St.
Boston, MA 02110
(617) 423-6440

of SEATTLE

NorthWest

RPG II PROGRAMMER

For software house installing general business systems in IBM Systems 3 environment. Heavy client interface/marketing support.

SYSTEMS ANALYST

To implement gen'l. business in on-line IBM DOS/VS RJE environment.

John Warner
(206) 624-8000

of PORTLAND

No. West

PROGRAMMER

FORTRAN/COBOL exper. Excellent opportunity in large IBM 370/OS/VS sophisticated state-of-the-art shop.

PROGRAMMER/ANALYST

Will implement financial systems in local IBM shop. Prefer COBOL and BAL. Excellent fringes.

Nancy Ankcorn
(503) 222-8775

of SAN FRANCISCO

No. Calif.

SR. SYS/PROGRAMMERS

Our clients need software prog's. for their IBM 370/IMS/MVS and 370/VM/CP/CMS installations.

CONSULTANTS PROG/ANALYST

COBOL. To implement systems in an IBM 370/IMS shop. Many positions.

RPG II PROGS, ANALYSTS

Learn OCL in Systems 3 shop. Many positions to D.P. Mgr.

Jerry Andersen
(415) 434-1500

FACULTY POSITION DALTON JUNIOR COLLEGE

The Business Computer Programming Department at Dalton Junior College has a 12-month permanent teaching position starting December 1, 1977. Duties will include teaching COBOL, RPG II, system analysis and other courses related to Business Computer Programming. Applicant should have a B.S. degree or beyond in Business Computer Science or related field with two years work experience in field. Salary ranges from $13,500 with B.S. and from $14,750 with Masters. Applications accepted through November 16, 1977. Larry Little, Chairperson, Vocational-Technical Division, Dalton Junior College, Dalton, GA 30720.

Equal Opportunity Employer

PROGRAMMER/ANALYST

Mississippi State University Computing Center has a position for a programmer to maintain and update its computing center accounting application, serve as editor of computing center bulletins and provide programming support to systems programmers. Joint academic appointment possible, excellent fringe benefits and opportunities for advancement. Salary commensurate with experience.

Send resume to: Dr. Wallace E. Killcreas Div. of Numerical Services Mississippi State University P.O. Drawer CC Mississippi State, MS 39762

Mississippi State University does not discriminate on the basis of race, color, religion, national origin, sex, age or handicap.

SYSTEMS PROGRAMMING

The University of Delaware is seeking candidates for openings in the area of Data Communications/Software Systems/PLATO project.

SYSTEMS PROGRAMMER, PLATO PROJECT

Responsible for the programming and related functions of the University's PLATO project. Minimum qualifications require equivalent of bachelor's degree with 1-2 years PLATO experience or associate degree with 4-7 years PLATO experience. Experience with other CDC software applications is desirable.

This position represents an opportunity to work within a centralized university computing center which utilizes not only a CDC CYBER but also a Burroughs 7700; DEC-10 and 11/70; and HP2000 access system.

Submit resumes including salary requirements by November 25, 1977, to:

Robert W. Raha
Computing Center, University of Delaware
Newark, DE 19711
An Equal Opportunity/Affirmative Action Employer

PROG/ ANALYST Long Island

If you're a top-notch COBOL 370/OS technician, our client needs you. Join on-line applications group. Gain valuable exposure to CICS and IMS.
$18-22,000 Fee Paid

ROBERT HALF
PERSONNEL AGENCIES

420 Jericho Pike
Jericho, N.Y. 11753
(516) 822-8080

BE A VICE PRESIDENT AND LIVE ON THE WEST COAST

Room at the top in well established and rapidly growing company which specializes in credit union and other financial DP systems. Strong management capability required, with ability to analyze and solve problems, deploy resources effectively, and challenge personnel. Free insurance, profit sharing and ESOP, plus opportunity to live in beautiful small city. All inquiries in strictest confidence.

Resumes and salary requirements to:
CW Box 3228
797 Washington St.
Newton, MA 02160

---

manager systems development

Our client, one of Canada's major real estate development companies with operations in Canada and the U.S., is about to undertake a major systems development program. We are looking for an experienced professional to mastermind this challenging assignment. Location, Edmonton.

This is an outstanding opportunity for a highly motivated individual who has proven leadership ability and broad systems development experience.

The successful candidate will be required to define management information requirements, to develop a conceptual plan and to direct the implementation of the systems. Emphasis in selection will be on prior experience relative to sophisticated accounting and reporting systems.

This position is offered on a two year contract basis. Generous compensation will be negotiated with the successful candidate.

Reply in confidence outlining education, experience and salary history.
File #3580.

2401 toronto dominion tower,
edmonton centre, edmonton, alberta
T5J 2Z1

Price
Waterhouse
Associates
management consultants

member: canadian association of management consultants

Faculty Appointments
Management Information Systems
and/or Mgmt. Science

The Department of Quantitative Methods, California State University, Fullerton is considering faculty appointments in Management Information Systems and/or Management Science. Preference given to applicants with DBA/PhD and experience in these two areas. Send resume to: Dr. LaVerne W. Stanton, Chair, Department of Quant. Meth., CSUF, Fullerton, CA, 92634. Closing date: February 15, 1978. CSUF is an equal opportunity/Title IX employer.

Director of Data Processing

DUTIES:

Directed by the Board of County Commissioners. Responsible for the applications, operations, data entry and control sections to achieve efficient use of the Data Processing department. Coordinates user interfacing. Prioritizes new system proposals. Reviews existing systems. Responsible for departmental administration to include budget preparation, staff supervision and equipment use.

QUALIFICATIONS:

B.A. in a Computer Science field and a minimum of five years' progressively responsible experience to include user interfacing, systems analysis and network design. Three years must be in management to include budget management and staff supervision. Must be able to communicate effectively in lay terms. $22,000 - $26,000 annually, depending upon qualifications.

Larimer County, Colorado
P.O. Box 1190
Fort Collins, CO 80522
Apply By: Nov. 18, 1977

E.D.P. AUDITOR/ CENTRAL FLORIDA

Position requires degree in Business Administration or Computer Science, CPA or 3-5 years Public Accounting or Bank EDP Auditing experience. Duties include developing policy and procedures for Computer Systems/Control and to develop and implement EDP Audit objectives and work programs. Complete fringe benefit program. Send detailed resume to:

CW Box 3331
797 Washington St.
Newton, Mass. 02160
An Equal Opportunity Employer

MANUFACTURING/ SUN BELT

HELP US REVOLUTIONIZE THE TELECOMMUNICATIONS INDUSTRY THRU DIGITAL TECHNOLOGY

Digital switching/transmission is the wave of the future — and we're the leader in this exciting technology. Our sales now stand at just over $1 billion but we confidently see $3 billion in the next 5 years.

- **System Analyst**
- **Programmer, Cobol, total Data base or HP3000 Image**
- **Industrial Engineers**
- **Manufacturing Engineers, electronics and assembly manufacturing experience.**

Take advantage of these exceptional career opportunities in digital-computer telecommunications. Starting salaries are attractive with complete company-paid benefits. Please send resume, in confidence, or phone: Harriet Brown, Personnel Manager, Northern Telecom, Inc., Advanced Telephone Products Division, 640 Massman Drive, Nashville, Tennessee 37210.

(615) 883-9220

nt northern telecom

An Equal Opportunity Affirmative Action Employer M/F

Positions available nationwide thru membership in the nation's largest network of employment professionals.
Send your resume in confidence to:

EXECUTIVE RESOURCES
SERVING THE NATION FROM DAYTON
Since 1968
40 S. Main St.
Suite 615
Dayton, Ohio 45402

INFORMATION SYSTEMS COORDINATOR

Salary range: $1596 - $2476
Application Deadline: 11/30/77

REMARKS: This is an LEAA funded position. Starting salary is commensurate with qualifications.

DUTIES: Develops an automated judicial information system for the Third Judicial District Court. Organizes Users Group Committee. Identifies and assist Committee in reaching its objectives.

MINIMUM QUALIFICATIONS: Should have a strong background in programming and system design.

Please send resume to:
Salt Lake County Personnel Office
135 East 2100 South
Salt Lake City, Utah 84115
Telephone: (801) 535-7351

SR. PROGRAMMER ANALYST & PROGRAMMER ANALYSTS

Immediate career opportunities in a professional environment in our National Data Processing Center. New DP Center building opening November, '77. Senior position requires 5 years experience. Other positions require 2 years as a COBOL (ANS) programmer. Must have experience in an IBM OS environment; inventory or distribution experience helpful.

These are challenging, demanding positions in a profitable and growing company. Please send resume and salary requirements to:

National Industrial
Relations-DLG
P.O. Box 191
Gardena, CA 90247

DATSUN
Nissan Motor Corp.
Equal Opportunity Employer M/F

MANAGEMENT INFORMATION SYSTEMS

You'll Find It All
At Itek Graphic Products:
High earnings.
Personal growth.
Professional environment.

SENIOR SYSTEMS ANALYST

We need an outstanding individual who has the ability to interface with all levels of management to convert ideas and plans into accomplishments. Initial application will be in the area of field inventory and distribution. A BS degree or MBA desirable. Must have 3-5 years programming experiance with 1-2 years as a programmer/analyst or 1-3 years as a systems analyst. Technical knowledge should include OS data/file management concepts, IBM programming/utilities and IBM hardware experience. Strong analytical background with experience in Data Base/Data Communications, distributed or terminal processing desirable.

PROGRAMMER/ANALYST

The individual we seek must have 3-5 years programming experience in ANS COBOL within an OS environment, with 1-2 years as a programmer/analyst. Must possess a good working knowledge of financial and general applications. Specific functional responsibilities will include analyzing, designing, coding and testing commercial systems. BS degree in business, computer science or equivalent experience desirable.

PROGRAMMER

The individual we seek must have 1-3 years ANS COBOL programming experience with at least 1 year in an OS environment. Distributed processing terminal experience a plus. BA or BS degree or equivalent desirable. Specific assignments will be in the areas of marketing, financial, manufacturing, and sales applications with emphasis on the installation of a nationwide Order Entry System. The computer environment is a 2 Meg 370-158 under OS/VS1.

For immediate consideration, please submit a detailed resume, including salary history in strictest confidence to Mr. A. James Fanteuzzo, Personnel Manager, Rochester Operations or call COLLECT at (716) 244-5600, Ext. 291.

Itek Graphic Products

1001 Jefferson Road
Rochester, NY 14603

An Equal Opportunity Employer M/F

DATA PROCESSING PROFESSIONALS

Excellent Oppty's in Portland, Oregon

Current openings:

MFG Prog/Anal — 370-DOS VS-CICS-DL-1 $15-24K

MS-Prog/Anal — Data Dictionary or Sys/Gen Exp. $16.5-20K.

Financial Prog/Anal Burroughs 4700 Cobol/MCP $15-25K

EDP is our exclusive field. We can cover the market for you. All fees paid. Relocation allowances available. Call Don Harris, Mgr. (503) 224-9575, or send resume.

**CompuSearch, 811 SW 6th,
Portland, OR 97204**

PROGRAMMER/ ANALYST

Progressive hospital has an immediate opening for a programmer/analyst with at least 3 years experience with IBM 360/370 hardware, and assembler language. Excellent career opportunities and benefits. Send confidential resume to: Carraway Methodist Medical Center, 1615 N. 25th Street, Birmingham, AL 35234, Attn: Data Processing.

DIRECTOR OF SYSTEMS SUPPORT

Start thinking FLORIDA - Giant Transportation co is setting up a new group. 5+ yrs major corporation experience with large IBM equipment. About 50% travel and high level interface to consult and recommend to management of major divisions of company. $35,000 + bonus and company car. FEE PAID

**ROBERT HALF
PERSONNEL AGENCIES**

522 Fifth Avenue
New York, N.Y. 10036
(212) 221-6500

Sales Representatives New Jersey Area

Make your first sales call for Digital and call on us- It's a good lead for your future.

Continued growth and expansion of our company, the world's leading manufacturer of minicomputers, has created a number of openings on our professional sales team.

With sales of over $1 billion this year, and an installed based of 100,000 computer systems, our track record speaks for itself.

If your track record is in computer hardware, systems engineering, or computer sales, and you have expertise in one of the following areas, then we should be talking:

Telecommunications • Laboratory • Commercial
• Large Computers • OEM • Engineering

**Call John Ganley
at (201) 469-9211**

We offer a competitive salary and a comprehensive benefits package, including life insurance, stock purchase plan, medical and dental plans, pension plan, tuition reimbursement and more.

If you can't call, write to John Ganley, Dept. K1114 3807, Digital Equipment Corporation, 11 Campus Drive, Somerset, N.J. 08873. We are an equal opportunity employer M/F.

digital

OPPORTUNITIES IN THE SUNBELT

**SR. TECHNICAL ADVISOR
To $33,540**

Major national manufacturer of computers, sales and services needs data pro to provide technical expertise on software/hardware applications and coordinate technical support. Prefer broad, diversified background utilizing Burroughs, Honeywell, Univac, Digital, Data General, or IBM software/hardware.

**SR. SYS. REPRESENTATIVE
To $27,420**

Plan, develop, design and coordinate advanced or unique systems applications, develop pre sales proposals, evaluate competition and maintain state of the art concepts. Dynamic expanding southern based corporation with unlimited advancement opportunities. Prefer broad diversified background in any 3rd generation systems applications.

**MARKETING REP
(COMPUTERS)**

Develop proposals to companies with data processing needs. (Main frame & mini-computer systems). Conduct demonstrations of systems capabilities. Specific responsibilities to develop new accounts in defined areas. Opening today in southern based corporation. Two to four year sales experience in hardware/software data systems. Lucrative compensation package.

**SR. MARKETING
REPRESENTATIVE
(COMPUTERS)**

Analyze a company's business activity to determine data processing needs. (Main frame & mini-computer systems). Develop proposals with systems and industry specialists to establish new accounts for expanding data hardware/software systems corporation. Immediate need. Client will interview now. Lucrative compensation package.

ALL FEES PAID

**EXECUTIVE PERSONNEL
CONSULTANTS**
5050 Poplar Ave. Ste. 1601
Memphis, TN 38157
(901) 767-6600
SEND RESUME

Include salary info. & requirements

Wanted... Computer performance specialists with a passion for analysis.

We are seeking imaginative individuals to contribute to Data General's computer performance evaluation (CPE) organization. The group's activities will include development of performance tools and methodologies for existing as well as future Data General architectures.

Preferably you should have experience with software/hardware instrumentation, simulation, analytical methods, and performance analysis. Work with interactive workload characterization would be a definite plus.

We want group oriented professionals to solve interesting problems in performance and fill responsible positions in our Development Methods Department. Knowledge of AOS or RDOS is desirable.

Please send resumes, in confidence, complete with salary history to Jim Stewart, Data General Corp., 15 Turnpike Road, Westboro, MA 01581. Or call him between four and six P.M. Eastern Standard Time, Mon.-Wed. at (800) 225-7347, ext. 3065, (In Massachusetts call collect (617) 485-9202, ext. 3065).

DataGeneral

An equal opportunity employer M/F

SYSTEMS ANALYST PROGRAMMER FOR NCR CENTURY 200 SITE

If you have a strong background in Mfg. systems development and min. 2 yrs job experience, we offer an excellent career opportunity with a major Manufacturer of Snack Foods. Call or send resume with present salary and requirements to

TOM'S FOODS INC.
Dir. Computer Services
PO Box 60
Columbus, GA 31902
(404) 323-2721

An Equal Opportunity Employer

SOFTWARE ENGINEERS

SAN FRANCISCO BAY AREA

Our client, a rapidly growing telecommunications equipment manufacturing firm is seeking mini/micro software professionals proficient in FORTRAN, assembler, or PL1 who are interested in developing state-of-art digital communication systems. Candidates should have a BSEE or BSCS, plus 1-4 years experience with real-time systems, networking, voice concentrators or related software/firmware projects. Excellent salaries, benefits and growth potential. An equal opportunity employer. Call or send resume to:

**Emmett Wilder, Manager
Gary Nelson & Assoc. Inc.
220 Montgomery St., Penthouse 1
San Francisco, CA 94904
(415) 398-3232**

*Executive and Professional
Recruiters
Fee Paid*

**EVERY BIT COUNTS
TOWARD SUCCESS**

SYSTEMS ENGINEERING:

FIRST IN TRUE 32-BIT MINIS
FIRST IN REAL TIME SOLUTIONS
FIRST IN CAREER OPPORTUNITY
ALL IN FORT LAUDERDALE

We're putting more bytes to work in a real time environment than anyone else in the industry. For almost 2 decades, we've bred a family of pacesetting systems, culminating in the first true 32-bit super mini . . . not a bridge-the-gap system from 16 bit architecture, but a true 32 bit machine with richer instruction sets and larger directly addressable memory.

This kind of presence means opportunity is here . . . now . . . along with the resources to really make a name for yourself. If being on the cutting edge of technology, surrounded by year round warmth and swaying palms sounds inviting, consider the many ways available for you to grow at Systems Engineering.

We welcome the professional who is highly motivated in the direction of creativity, fresh conceptualization, and imaginative problem-solving, in state-of-the-art design and software development of small to medium real time systems.

PROJECT LEADERS SOFTWARE DEVELOPMENT

- SOFTWARE DEVELOPMENT or maintenance, with hands-on experience with multiprogramming operating systems and/or language compilers (FORTRAN, COBOL, PL/1, etc.) Familiarity with SEL Real-Time Monitor desirable.
- OPERATING SYSTEM DESIGN for virtual machines, using high-level implementation languages (PASCAL, APL, SPL.)
- PROJECT LEVEL responsibility for data base management of minicomputer-based communications systems.

REQUIREMENTS: Growth has created many openings. At least 2-4 years R&D experience is needed in one or more of these areas, 6-10 for higher and project levels. Relevant degree required, advanced degree highly desirable. Starting salaries will fully reflect your qualifications, with liberal benefits additional. Please send resume and/or letter of information detailing achievements and current salary in confidence to Dan Squires, Employment Manager, Dept. S1114 CW.

SYSTEMS
ENGINEERING LABORATORIES

6901 W. Sunrise Boulevard, Fort Lauderdale, Fla. 33313
Equal Opportunity Employer M/F

5

ASSISTANT DIRECTOR

Supervise daily operations, staff of 15; help with policy and planning for computing installation supplying instructional support to College of Engineering. Large Harris midicomputer, upgrading to virtual memory, multiprogramming OS. BS in Engineering or Comp. Sci. thorough knowledge of Fortran, required; systems programming expertise, supervisory experience preferred. Salary $12,000 to $16,000. Send resume to: C.H. Davidson, Engineering Computing Laboratory, University of Wisconsin, Madison, WI 53706

An Equal Opportunity Employer

SENIOR PROGRAMMER ANALYST

Responsibilities include development of system and hardware specifications in a multidisciplinary Health Sciences Centers environment. Qualifications: Bachelor's degree, advanced degree in computer sciences desirable, minimum of five years experience in design and implementation of computer systems in health care field using data communication (teleprocessing) and statistical computing techniques is MANDATORY. Salary commensurate with qualifications. Send resume to Texas Tech University Health Sciences Centers, Personnel Division, P.O. Box 4569, Lubbock, Texas 79409. Applications must be received by November 15, 1977. An Equal Opportunity Employer.

Traveling Programmers

LONDON★PARIS★GENEVA★MUNICH

Our client company, a local computer manufacturer, is currently looking for several support and development programmers for up to 40% travel to these and other European installations.

These positions require 2 years of programming experience and a knowledge of either FORTRAN, COBOL or ASSEMBLY. Exposure to clinical chemistry or medical applications would be a plus. The positions require customer contact in English.

The manufacturer is listed in the N. Y. Stock Exchange and has enjoyed an average 30% growth rate over the last 5 years. To you this means security, opportunity for advancement and the finest benefit portfolio available. These positions pay between 16-22K and must be filled immediately.

Please call or forward your resume to:

digital arts group
Engineering & Software Personnel Consultants
Nine Bedford St., Burlington, MA 01803
(617) 273-2780

Our staff will also be available for consultation Monday & Wednesday evenings until 8 PM.

PROGRAMMERS

Move Up to the Major League ... and Grow with the $100 Million + Leader

The developer of TYMCARE and other advanced information systems, we're an important arm of Tymshare, Inc., the largest and most prestigious independent timesharing company in the nation. Expansion creates several growth positions for COBOL programmers with at least 2 years accounts receivable experience in a commercial environment. From the start, you'll have important responsibilities in a blue ribbon environment that acknowledges individual contribution. A competitive salary; excellent benefits; including a stock purchase plan; and an attractive northern New Jersey setting are still other advantages. Please send your resume, in confidence, to:

Bill Park
TYMSHARE®
MEDICAL SYSTEMS
46 Industrial Avenue
Mahwah, New Jersey 07430
EOE/MF

DATA PROCESSING POSITIONS

We are looking for professionals who can help us build a large data processing organization to support a huge construction effort in the Middle East.

Morrison-Knudsen, a major engineering and construction firm, is the managing partner in the Morrison-Knudsen Saudi Arabia Consortium. MKSAC is involved in the construction of a city in Saudi Arabia, including all infrastructure, from the sand up. Domestic headquarters for MKSAC have been established in Columbia, Maryland. We are now ready to build the large scale data support organization. Immediate openings include:

SYSTEMS ANALYSTS
SYSTEMS PROGRAMMERS
TIME SHARE ANALYSTS/PROGRAMMERS
PROGRAMMER ANALYSTS
PROGRAMMERS
SHIFT SUPERVISORS
COMPUTER OPERATORS
PRODUCTION APPLICATIONS
AND OTHER DATA
PROCESSING SUPPORT PERSONNEL

The operating environment includes MVS, JES2, and TSO. CICS and DL/1 will provide the on-line and data base environment

Experience with structured design and programming concepts are desirable to support the implementation of the project's systems. On-line systems experience using CICS is also needed. Specific applications include general ledger, accounts payable, project scheduling, material control (engineering take-off, procurement, expediting and inventory), personnel, construction equipment management, and records management. Languages utilized will be COBOL and MARK IV.

This is a rare opportunity for aggressive, goal-oriented individuals to take part in building a large organization from the ground up. If you are a self-starter who enjoys challenge, forward your resume and salary history to:

Professional Placement
MKSAC
Dept.DPCW2, P.O. Box 189
Columbia, Maryland 21045

An Equal Opportunity Employer M/F

Top Salaries in the Sun Belt for D.P. Pro's

Many of our best client companies have started to formulate their 1978 requirements. Prime S.E. & Coastal locations. Confidentiality assured. Enjoy the outdoors year-round!

PDP.11.RSX-11M P/A'S	$28K
BANK PROJECT LEADERS	$27K
SYS. COORDINATOR	$23K
SYS. PROGRAMMER'S	$25K
SENIOR ANALYST-MRP	$24K
BANK PROG/ANALYSTS	$21K
BANK/LIFE PROG'S	$16K
APPLICATIONS PROG	$15K
SYSTEM 3/15-CCP	$18K
DISTRIBUTION A/P	$17K
MANUFACTURING P/A'S	$17K

MANY MORE POSITIONS TOO NUMEROUS TO LIST

AVAILABILITY, INC.
Dept C/5401 W Kennedy Blvd /Suite 285
Tampa FL 33609/(813) 872 2631

Mgr., Sys. & Prog. $38-40K
New position, reporting directly to VP for super achiever to guide sophisticated, image-oriented 370 staff.

Mgr., Data Comm. to $35K
Key position at corp data center directing tech. aspects of high speed (100K+ bauds) data set transfer network connecting 20 divisions nationwide.

Data Base Mgr to $34K
Top notch staff being selectively built at delightful 130+ acre hqs. of F-500 co. in 4 season vacation area.

Sr. Sys. Prog. to $30K
Exciting oppty to stay ahead of your software peers supporting super data center with MVS, IMS and T/P.

Dir., Syst. Planning to $30K+
High visibility corp assignment with $4 billion+ co. developing realistic, cohesive, long range EDP plans. Stepping stone to executive suite.

Project Manager to $25K
Int'l. co., a pioneer data base mgt systems user, seeks ambitious indiv to steer major planned endeavors.

Real Time Prog to $28K
Project mgmt. oppty with mfr of computerized lab equip. for RSX-11 expert.

Systs Analyst/Prog to $24K
Ideal working conditions, an excellent benefit pkg. and generous salary reviews beckon the competent Cobol, OS/JCL business applications professional.

COMPU SEARCH

A division of Management Recruiters
807 Boylston St.
Boston, MA. 02116
(617) 262-5050
10 Forbes Rd.
Braintree, MA 02184
(617) 848-1886
1500 Main St.
Springfield, MA 01115
(413) 781-1880

The RHFactor, Inc.

The Consulting Option...

... In the past, experienced Programmer/Analysts searching for new career directions had few options available. They could move to a position within an employer established D.P. environment, or opt for a typical consulting organization. At The RHFactor, you'll discover a unique option to establish yourself as an experienced independent contractor.

Our company was formed to provide solutions to diverse problems traditionally found in the data processing consulting field: Price, Performance and Credibility. At The RHFactor you'll realize the opportunity to utilize your COBOL, BAL or RPG II experience on projects ranging from one to nine months.

If the opportunity to retain your independence while earning a standard $11.00 per hour interests you call:

Rita Kassan
(312) 664-2727
The RHFactor, Inc.
30 W. Washington, Suite 900
Chicago, IL 60602

Systems Professionals

HAMMERMILL PAPER COMPANY

initiates major MIS expansion program, seeks to add TWO key professionals to staff. Our hardware is large scale IBM.

BUSINESS SYSTEMS CONSULTANT

Requires strong analytical skills and 3-5 years business consulting or systems problem solving experience in a manufacturing environment, with expertise in the financial, costing, inventory & production control functions. Should also have 2-3 yrs in multiple computer system implementation. BS necessary. MBA an asset.

PROJECT LEADER

Experienced in Computer Systems Development, to plan, organize, lead the design, programming and implementation efforts for our distribution and manufacturing systems. Requires 5-7 years batch and on-line experience in systems and programming, demonstrated ability in project management and thorough knowledge of IBM equipment. Familiarity with distributive processing desired, college degree preferred.

Successful candidates will be management-oriented with excellent written and oral communication skills. To explore these unique growth positions offering attractive compensation and benefits package please send resume with earnings record in confidence to:

James Chandler,
Director Salaried Personnel
Hammermill Paper Company
1453 East Lake Road, Erie, PA 16507
An Equal Opportunity mployer M/F

PROGRAMMER/ANALYST

Newspaper group has an immediate opening for an individual with knowledge of DEC PDP-11 with RSTS operating system. Will be responsible for development, installation and maintenance of business systems in the BASIC PLUS, BASIC PLUS 2 and RPG programming languages at local newspaper sites.

An unusual opportunity for the right individual to advance the state of the art in on-line interactive business applications. Excellent growth potential, competitive salary and fringe benefits. Some travel necessary. All replies will be held in strict confidence. Send resume and salary requirements to:

CW Box 3162
797 Washington St.
Newton, Mass. 02160

MIS Management Opportunities

Austin Industries' newly formed information systems department is looking for a top analyst to manage the construction systems section. This analyst must have excellent analytical and conceptual skills to head up a systems planning effort in a multi-company environment. The ideal candidate should have come up through the programming ranks and have a firm knowledge of data base design concepts.

This person must have experience in estimating, job planning, scheduling, cost engineering, progress reporting and materials planning for construction projects.

Austin Industries is a diversified construction and manufacturing organization. The corporate subsidiaries engage in virtually every type of heavy and commercial construction activities and also manufacture two leading brands of farm machinery.

If you want the challenge of developing and implementing an integrated MIS plan for a major corporation, please contact Ed Moore at 2949 Stemmons Freeway, Dallas, TX 75221, or call (214) 630-5100, ext. 410 for consideration

Austin

Austin Industries
an equal opportunity employer m/f

SYSTEMS SOFTWARE SUPPORT MANAGER

A challenging technical/management opportunity is current available with one of the nation's largest educational computing networks.

Primary responsibilities will include:

- Supervision of a group of Systems Analysts and Programmers engaged in supporting time-sharing operating systems at 19 campuses and a central shared facility.
- Systemwide technical advice and consulting services for the design and evaluation of computer techniques in serving extremely complex data processing problems in a network environment.
- Aid in the evaluation of requests for new or revised data processing equipment and software.
- Participation in the development of state and systemwide data processing standards and procedures.
- Involvement with adaptation of the State of California ATSS/DS communications network to meet varied and changing academic requirements.

Successful candidate will have a BA or BS, preferably in a computer related field, and a detailed knowledge of systems analysis principles and techniques using modern computer hardware and software. Requires 5 years of progressively responsible technical and management experience. Two of the 5 years must include working with the internals of DEC RSTS/E or CDC KRONOS/NOS operating systems or combination of both.

Compensation for this responsible position, located in the Los Angeles Miracle Mile area, ranges from $23,352 to $28,188. This position is exempt from Civil Service testing. Resumes should be received no later than November 25, 1977 and should be addressed to:

THE CALIFORNIA STATE UNIVERSITY & COLLEGES

Personnel Services
400 Golden Shore
Long Beach, CA 90802
Equal Opportunity/Title IX Employer

We can give you 3 good reasons to call Robert Half for data processing positions:

1. Robert Half has been in business for about 30 years. Can you name an EDP personnel service that's been around longer?

2. Robert Half specializes. We've been an integral part of the data processing community through all its generations.

3. Robert Half's offices are staffed by experts in the EDP field.

and if 3 reasons aren't enough, we can give you 55 more:

55 offices Robert Half is a network throughout the U.S., Canada and Great Britain. One call and you've searched the local market ... or the world.

and if 58 reasons aren't enough, we can give you Half a reason more:

Robert Half. Where integrity is a lot more than just HALF.

ROBERT HALF PERSONNEL AGENCIES

Look in the white pages.

SYSTEMS PROGRAMMER

Mississippi State University Computing Center has a position on its systems programming staff for a highly motivated person with a minimum of a bachelor's degree and systems programming experience. UNIVAC 1100 experience highly desirable. Salary commensurate with experience. Excellent fringe benefits and opportunities for advancement.

Send resume to:
Dr. Wallace E. Killcrees
Div. of Numerical Services
Mississippi State University
P.O. Drawer CC
Mississippi State, MS 39762

Mississippi State University does not discriminate on the basis of race, color, religion, national origin, sex, age or handicap.

LEAD COMPUTER OPERATOR

Plans, organizes, and controls Computer Operations Section in operation of Computer and Peripheral Data Processing equipment. Has full charge of all activities of Equipment Operations. Established schedules for maximum utilization of equipment. Assigns personnel to operations. Instructs and trains personnel where necessary. Coordinates activities with other Data Processing sections. Two years experience in supervisory position desirable. Contact Vance B. Nelson, Computer Services, Michigan Technological University, Houghton, MI 49931. An equal opportunity educational institution/equal opportunity employer.

PROGRAMMERS/OPERATORS

IMS/PARS Applications Programmers

Allegheny Airlines has immediate openings for experienced Applications Programmers for 360/370 IMS, PARS, BATCH/TP, working in project environments. Salary commensurate with skill/ability/experience.

Attractive benefits and travel privileges, up-to-date equipment and modern work facilities. Convenient location at our Computer Center in Arlington, Virginia.

Computer Operators

Allegheny Airlines has immediate openings for Computer Operators with a minimum of 1 year experience in MVS/JES2, 370 IMS, or PARS.

Allegheny Airlines - Sixth Largest U.S. Passenger Carrier. EEO Employer, M/F.

Send resumes for Programmers and Operators, in confidence, to:

Mr. D. Bray Rathka
Allegheny Airlines Incorporated
Employment Services
Washington National Airport
Washington, D.C. 20001

PROGRAMMER ANALYSTS

SEEKING CAREER OPPORTUNITIES WITH

CHALLENGE
INNOVATION
DEVELOPMENT

Federated Department Stores, a national leader in retailing, has a major systems development program in progress that is committed to developing advanced retailing systems incorporating data base and distributive processing capabilities.

Advanced technologies include:

IMS/VS MVS NCP SNA

VTAM VSAM TSO Data Dictionary

Methods Include: Top-down design, HIPO, structured walk-through, simulation.

There are still some ground floor opportunities at the forefront of design and development for PROGRAMMER ANALYSTS who have above-average credentials and would like to embark their careers in our long-term retail systems research and development program.

If your background includes solid COBOL programming experience on large scale IBM equipment with exposure to IMS concepts, and you're ready to advance your career in a highly professional environment, working with concepts that are ahead of existing technology, then send your resume, including recent salary history to:

Mr. Frank McKain

Federated Department Stores, Inc.

Systems Research & Development, Room CW-1114
222 W. 7th St., Cincinnati, Ohio 45202
ALL REPLIES HELD IN STRICT CONFIDENCE

An Equal Opportunity Employer

PROGRAMMER ANALYST

Are you tired of feeling like you're not getting ahead in your current position? Why not take a step forward to an exciting new phase of your career in data processing. Due to an increase in staff requirements, Computer Dynamics, Inc., has IMMEDIATE openings for trained data processing professionals. If you have a minimum of 3 years COBOL, FORTRAN, ASSEMBLER or IMS experience on IBM, Burroughs, Honeywell or mini-computers we would like to talk with you NOW.

CDI, a successful firm supplying data processing services to a wide variety of client companies is offering you, JOB STABILITY coupled with a diverse array of interesting assignments, all in a current state-of-the-art environment, plus a competitive salary, bonus program, profit sharing and comprehensive benefits including dental.

Positions available in Michigan and Ohio. Please call collect or send a resume to Rich Lai for more information on how you can be part of our increasing team of professionals.

(313) 357-4200
COMPUTER DYNAMICS, INC.
19400 West Ten Mile Road
Southfield, Mich. 48075
An Equal Opportunity Employer M/F

Computer Dynamics, Inc.

PROGRAMMERS

Combine the quality of life in the Minneapolis area with an innovative, aggressive approach to data processing and outstanding advancement potential in a challenging professional environment and you've got a winner in all respects.

Continued growth and expansion in Hennepin County's Data Processing Department has brought all these factors together. We're offering these winning positions to experienced COBOL programmers. Advantages include challenging responsibilities in a large scale IBM shop combined with excellent opportunities for advancement. The County also offers a liberal salary and benefit package.

We are currently involved in developing applications in a variety of areas. If you desire a change from your normal routine and are anxious to assume greater responsibility, this is the ideal work environment for you. Send your resume in complete confidence to:

Dave Sier
Hennepin County
Personnel Department
A-3 Government Center
Minneapolis, Minnesota 55487

Hewlett-Packard 3000

Senior Analyst/Programmer Analyst

This major chemical manufacturing corporation is seeking two professionals to develop and install systems in an on-line multi-terminal minicomputer environment at our plant near Baton Rouge, Louisiana. Hardware will be HP 3000 Series II using COBOL, SPL, and Image Data Base.

The Senior Analyst will operate as the project leader of a small team and assume total responsibility for the installation, start-up, and continuing support of a large HP 3000 minicomputer system. Initial development effort will be in Inventory and Purchasing areas.

Requirements include a related degree and 2-3 years minicomputer experience, HP 3000 preferred.

Salary will be commensurate with qualifications. For confidential consideration forward resume including salary history to:

Department AJC
BASF Wyandotte Corporation
P.O. Box 181
100 Cherry Hill Road
Parsippany, New Jersey 07054

An Equal Opportunity Employer

BASF

Director of Academic Computing Services

Applications are sought for Director of Academic Computing Services. George Mason University, the State University in Northern Virginia, with 9500 students is located in Metropolitan Washington, D.C. It offers 39 Baccalaureate and 17 Masters programs.

This is an opportunity to participate in the development of a university computing center. Minimum qualifications include MS in Computer Science or related field, 2 years experience in Computing Center operations, programming experience in high level languages, and an ability to work with a wide variety of computer users.

It is desired that the successful candidate have some knowledge of systems programming, experience in an academic computing environment and some evidence of administrative ability. Salary is commensurate with qualifications and experience. The position is available 1 February 1978. Send resumes and names of three references by 1 December 1977 to Professor Stephen B. Seidman, Graduate School Office, George Mason University, 4400 University Drive, Fairfax, VA. 22030. An EEO/AA employer.

Data Terminal Sales

If your career path is in Sales, this is a unique growth opportunity for aggressive, enthusiastic Data Processing or Communications professionals. We are a full line computer terminal company breaking away from the pack with an exciting new product. A sophisticated micro-processor based flexible disk controller with an untapped, wide open marketplace. Full management and technical support. The most advanced field service capability in the business.

Excellent compensation through salary and commission. To explore this sales opportunity, call Mr. Hansen, Toll Free

800-631-7050 Ext. 423
or write to Personnel
western union data services
70 McKee Drive
Mahwah, N.J. 07430
Equal Opportunity Employer M/F

SOFTWARE SALES

We're looking for highly motivated systems software salesman with experience selling to the IBM DOS and DOS/VS marketplace. If you want to increase your income potential with a broad and diversified product line, call Bert Parsloe at (203) 792-5100. Universal Software, Inc. Brookfield Office Park, Brookfield, CT 06804.

Growing six state, seven office law firm with midwestern headquarters looking for an imaginative person with substantial experience in research and computers. Race, creed, color, sex, age, handicap of no consequence if you have a good mind and creative attitude. A real chance to grow and make money! Send resume to CW 3227, 797 Washington St., Newton, Mass. 02160.

DP PROFESSIONALS

Fee Paid

BANKING	
CPCS or MICR	$25,000
DDA, TDA or Loans	19,000
EFTS or TRUSTS	18,000
SCIENTIFIC & ENGINEERING	
Recent Grad	13,800
5-6 years exp.	30,000
IMS (all levels exp.)	25,000
PL1 PROGRAMMERS	
Deg. + 6 mo. exp.	14,000
Deg. + 5-6 yrs. exp.	22,000
ALC or COBOL PROGRAMMERS	
Recent Graduates	12,600
Deg. + 1-5 yrs.	22,000

DUNHILL
Employment Agency
of Fort Worth, Inc.
801 Ridglea Bank Bldg.
Fort Worth, TX 76116
(817) 732-8181

ANALYST PROGRAMMERS

M.I.S. International, an internationally known computer systems integration organization, requires specialized professionals for top assignments in southeastern Michigan and Ohio areas.

MIS is developing advanced systems in:

- Energy Management, Process Control, Communications, Data Base Management

Knowledge of the following computers is desirable:

- MINICOMPUTERS: ModComp IV, CAI/LSI-II, PDP-11
- LARGE COMPUTERS: B6700/4700, IBM 370, H6000

Top salaries, fully paid fringes include life, health and dental insurances, moving allowance and educational benefits. To arrange an interview, call or send your resume to Mr. Gene Bryant.

M.I.S. INTERNATIONAL, INC.

31380 Smith Road
Romulus, Michigan 48174
(313) 328-7010

GRAPHICS PROJECT MANAGER

Control Data Corporation Application Services Division has an immediate opening for an experienced Project Manager in its suburban Twin Cities plant.

This lead position is in development of new Interactive Graphics Systems with emphasis on software for distributed processing. Candidates are required to have a minimum of 4 years experience in graphics software and/or distributed processing. An advanced degree in Engineering or Computer Science is desirable.

We can offer you an opportunity to work in a large and expanding company. We can also offer you advancement in both technical and managerial careers. Please send your resume along with salary history or call:

A.T. Chu
(612) 482-2578 COLLECT
CONTROL DATA CORPORATION
4201 Lexington Avenue North
St. Paul, Minnesota 55112

An Affirmative Action Employer M/F

---

computer field engineers & computer service reps

for Northeastern, Central, Southern & Western areas

Did you know that we maintain MORE computers NOW than when we manufactured them?

The reason? General Electric Installation & Service Engineering provides a world-wide computer service network to user customers, OEMs and computer manufacturers who need a ready-made PROFESSIONAL service organization. We're growing and continuing our expansion at a fast pace.

We can therefore offer an unusually productive career climate to the self-motivated professionals with minicomputer systems hardware experience in

- DEC PDP 8/11 . . . and
- Data General NOVA/ECLIPSE

Salaries are consistent with experience, augmented by an excellent benefits package.

Want to talk careers with I&SE? Send your resume indicating current salary and geographic preference to Mr. D.M. Marini, Manager-Employee Relations, Electrical & Electronic Service Dept., General Electric, One River Road, Ref. CW, Bldg. 2, Room 263, Schenectady, N.Y. 12345.

GENERAL ELECTRIC

An equal opportunity employer

Online Application Systems
DB/DC Internals Development

We are a rapidly growing data processing service organization located in Cincinnati, serving the financial communi' ·, We offer challenging opportunities in research and development for highly motivated data processing professionals.

We are seeking individuals that have a minimum of 2 years Assembler language experience with knowledge of OS or OS/VS data management and supervisor services. Knowledge of VSAM, VTAM or TSO is a definite plus.

Batch application positions also available.

We offer a liberal compensation and benefit package including profit sharing. Please send resume, including salary history or call:

Robert L. Starett
Manager, Technical Services
Midwest Payment Systems
Fifth Third Center
Cincinnati, Ohio 45202
(513) 579-5394

An Equal Opportunity Employer

Programmer Analyst/Systems and Procedures Analyst

Star-Kist Foods has immediate openings for Senior Systems and Procedures Analyst, and two Senior Programmer/Analysts. Must be self-starting individuals with 5 years manufacturing or distribution background, with appropriate education.

Methods and Procedures Analyst must analyze, develop, and implement procedures and policies for computer or manual systems, design and control company forms, and be able to communicate with all levels of management.

Senior Programmer Analyst with design, program and implement business applications, be proficient in ANS COBOL on IBM 360 or 370 computer using DOS. He will be involved with on-line (CICS) or data base (DL-1) application systems.

We offer competitive salaries, extensive fringe benefits and fantastic climate. Send resume and salary history to:

STAR-KIST FOODS, INC.
Box 3306
Terminal Island, CA. 90731

SYCOR

SYCOR CONTINUES ITS PROGRAM OF NATIONAL EXPANSION!

As a leading force in the technological development manufacture of distributed data processing systems, our need for Systems Engineering and Sales Professionals continues to grow. Openings exist in major cities throughout the U.S. for career-oriented people in the following areas:

SYSTEMS ENGINEER

COBOL or Assembler programming experience essential, communications with bi-sync and on-line background helpful. Ideal candidate will have the above experience, a BS degree, and a background in either Micro-Mini systems or programmable terminals or systems support. Any exposure to data entry applications and marketing customer support would be an asset.

SALES REPRESENTATIVES

Requires a minimum of 3 years terminal, peripheral or small systems sales experience, plus a general knowledge of DP applications including communications. Candidates must display the proven ability to meet sales quotas for a complete line of computer products and support services.

We offer a competitive range of salaries, comprehensive benefits and highly visible opportunities for future growth. To arrange an interview, send your resume to:

SYCOR, INC.
100 Phoenix Drive
Ann Arbor, MI 48104
(313) 995-1156

As an Equal Opportunity and Affirmative Action Employer, Sycor, Inc., Urges Females and Members of Minority Groups to Apply.

"Sycor Puts Computer Power Where the Work is"

SYCOR

SENIOR SYSTEM PROGRAMMERS

Optimum Systems Inc., one of the nation's leading computer utility organizations, is currently expanding our SUPER-WYLBUR* development group in Santa Clara, California. We have immediate career positions for Senior System Programmers.

You should have a degree or equivalent and 4 to 8 years experience working with large scale IBM 360/370 operating system internals. (MVT, VS1, SVS or MVS). Strong background in assembler language, and a working knowledge of interactive terminal systems, preferably WYLBUR is desirable. Experience with HASP3, HASP4 or JES2 is also desirable. Must possess good communicative skills. Some supervisory skills a plus.

You will be involved with the development, enhancement and maintenance of SUPER-WYLBUR, the newest generation terminal system with complete support for text management, job submission and retrieval and word processing. Candidates must be self motivated with solid record of accomplishments.

Ideally located in the San Francisco Bay area, OSI offers an excellent benefits and salary package coupled with an aggressive, dynamic environment in which to work and grow. To further pursue these outstanding career opportunities with our growing corporation, send your detailed resume and salary requirements to:

SUPERWYLBUR Dept.

OPTIMUM SYSTEMS INCORPORATED

2801 Northwestern Parkway
Santa Clara, Ca. 95051

An Equal Opportunity Employer M/F

** SUPERWYLBUR is a mark of Optimum Systems, Inc.*

SYDNEY UNIVERSITY

AUSTRALIA

LECTURESHIP IN COMPUTER SCIENCE

Applicants should have higher degree or equivalent qualification in Computer Science; background and interest in digital or software engineering is particularly desirable.

The Department is equipped with several mini-computers and has on-line access to the University's Cyber 72 computer. It offers courses in Computer Science from first-year to honours level, followed by M.Sc. and Ph.D. programme. Appointee expected to teach and carry out own research.

Information available from Registrar, University of Sydney, NSW 2006, Australia with whom applications close on 30 November 1977.

TOLL FREE

800/633-6644

In Alabama Call Collect
205/328-2931
24 Hr. Telephone Service

SUNBELT SERVICE

Mgr/Univac Shop	35K
DP Mgr/Overseas	30K
Tech Support, Mfg	27K
370 Sys Prog/Bank	26K
PDP 11 Software	25K
Bank DP Proj Ldr	25K
Anal Mfg, 370	23K
Ins, 370, Anal	22K
Sys Progr/Retail	22K
370 Prog/Anal	21K
Syst Anal	21K
Honeywell 6000 P/A	20K
Sys Progr/Ins	19K
Chief Progr/Cobol	19K
DEC Prog	19K
System/3 Mgr	19K
P/A, Mfg, IBM 370	18K
P/A, Univac	18K
N/C Prog	17K
P/A, Burroughs	17K
PL/1 Prog	16K
Bal Prog	16K
P/A, NCR, Retail	15K

Representative listing of current southern opportunities. Additional positions available in south and nationwide. All fees paid. Call Ole Olson or mail resume for fast, confidential service

GENERAL PERSONNEL CORPORATION
Brown Marx Bldg
Birmingham, Ala 35203

SR. SCIENTIFIC PROGRAMMERS

We have immediate openings for Scientific Programmers with 5 or more years experience in real-time, simulation processing. Degree in engineering or mathematics; mini computer experience a definite plus. Relocation assistance and excellent company-paid benefit package. If you qualify, please call or send your resume in complete confidence to:

CW
PRIDE IN PERFORMANCE

Mr Neb Attaway
CUTLER-WILLIAMS, INC.
7700 Leesburg Pike, Suite 115
Falls Church, VA 20043
Call Collect 703-821-8595
an equal opportunity employer M/F

ShareYourself...Teach

Just another cliché or a career opportunity?

Our success and growth have resulted in an exceptional career opportunity for you if you've been honing your MVS or JES3 skills by doing, and now desire to take the next step in the "learn-do-teach" cycle. Join the growing software instruction team at Amdahl and learn why so many people say that teaching is the most fun they've had in their DP careers.

SOFTWARE INSTRUCTORS

We currently have openings at our Sunnyvale, California headquarters for qualified professionals ready to take that next step. We invite you to send your resume in confidence to Phil Beckhelm, Professional Employment, Amdahl Corporation, 1250 East Arques Avenue, Sunnyvale, CA 94086. If you're not quite ready or need more information, please call Charlie Wareing, 408/735-4326 (collect), in our Software Education Department. He'll be happy to talk with you. We are an equal opportunity employer.

amdahl

MANAGER OF MARKETING/ SMALL COMPUTER SYSTEMS

A major and internationally known computer manufacturer is currently seeking a Marketing Manager for its Corporate Headquarters staff.

Concentrating in the area of Small Business Systems, primary responsibilities include evaluation of market opportunities, competitive analysis, development of appropriate product, marketing and sales plans and the implementation of sales and support aids to assist the Field Sales organization in selling the markets and products assigned to you.

Qualifications should include several years of sales and/or marketing management background in the mainframe or minicomputer business with technical orientation. An MBA is highly preferred.

Interested applicants please send resume, including salary history, in confidence to J.W. Haynesworth and Associates. CW Box 3335, 797 Washington St., Newton, MA. 02160.

THERE IS A DIFFERENCE BETWEEN DEVELOPING SOFTWARE AND WRITING PROGRAMS

At American Management Systems (AMS) we know the difference. That's why we are fast becoming the major supplier of sophisticated financial, order entry, and payroll systems. Our products are based on advanced software techniques rather than a large number of individual programs.

To continue our rapid growth, we are expanding our staff of software development specialists. We are looking for professionals with a minimum of three years experience in software development and skilled in the use of IBM OS/DOS/MVS assembler language, PL/1 and operating systems functions.

At AMS we understand the value of skilled software specialists; hence salaries and advancement are excellent and you don't have to take on management and administrative responsibilities to advance rapidly. Your ability to develop software as a member of a truly exceptional team will be the only measure of your performance.

If you are interested, we'd like to learn more about you and tell you more about AMS. Please send us your resume with salary history; if we believe you're qualified, we'll send you a copy of AMS In Perspective and schedule an interview at our headquarters office which is located in the Washington, D.C. metropolitan area.

Frank A. Nicolai
Executive Vice President

AMERICAN MANAGEMENT SYSTEMS, INC.

Department M
1515 Wilson Blvd.
Arlington, Virginia 22209

AMERICAN MANAGEMENT SYSTEMS INC

An Equal Opportunity Employer

ASSOCIATE DIRECTOR DATA PROCESSING

To manage systems programming, user services, and the computer center facilities at a progressive community college. Prime requisites are: Bachelors degree and five years experience; systems programming experience with DOS/VS, CICS/VS or other TP monitor, and TOTAL or other DBMS; experience interfacing with users; and familiarity with computer center operations. Management experience in higher education, and accounting training are definite assets. Excellent compensation package with salary to the 2d's. Send resume by December 1, 1977 to:

Dir. of Professional Personnel
College of DuPage
22nd and Lambert Rd.
Glen Ellyn, IL 60137
Equal Opportunity Employer

SYDNEY UNIVERSITY

AUSTRALIA

LECTURESHIP IN COMPUTER SCIENCE

Applicants should have higher degree or equivalent qualification in Computer Science; background and interest in digital or software engineering is particularly desirable.

The Department is equipped with several mini-computers and has on-line access to the University's Cyber 72 computer. It offers courses in Computer Science from first-year to honours level, followed by M.Sc. and Ph.D. programme. Appointee expected to teach and carry out own research.

Information available from Registrar, University of Sydney, NSW 2006, Australia with whom applications close on 30 November 1977.

National Airlines

MIAMI OPENINGS

NEWLY CREATED POSITIONS
IN EXPANDING 360/370
COMPUTER CENTER

IMS SYSTEMS PROGRAMMER

Minimum 2-years experience required.

REAL TIME PROGRAMMERS

Minimum 2-years IBM BAL experience required. PARS experience preferred, particularly ACP and Support specialists.

APPLICATIONS PROGRAMMERS

Minimum 2 years 360/370 COBOL or BAL, PARS experience beneficial.

Position and levels commensurate with experience. Salary history must be submitted. No trainees need apply. Send resume to:

PERSONNEL DEPT.
National Airlines
P.O. Box 592055 AMF
Miami, Fla. 33159

---

computer hardware and software candidates...

RELAX

We have scores of openings in all parts of the U.S. Our fees are paid by hiring companies anxious to find qualified computer hardware and software candidates. Contact the nearest office for confidential service and let us do the footwork.

MAERKLE, FRENCH ASSOCIATES
1044 Hanna Building
Cleveland, Ohio 44115
(218) 861-5995

ANDERSON-TAYLOR
P.O. Box 21
Exton, Pennsylvania 19341
(215) 383-1600

COMPUTER CAREERS INC.
Specialists - Data Processing
4720 Montgomery Lane, #503
Bethesda, Maryland 20014
(301) 654-9225

D. BROWN & ASSOCIATES
Dorothy Spiegel DP Specialist
610 S.W. Alder, Suite 711
Portland, Oregon 97205
(503) 224-6980

CAREER SPECIALISTS
PERSONNEL SERVICES
Zuki McGuire - EDP Dept.
4900 El Camino Real, Suite 208
Los Altos, Calif. 94022
(415) 941-3200
members of
National Personnel Associates®

CINCINNATI

Operations Mgr 370	$30k
Mgmt. Services	27k
Software/Real Time	25k
Systems Analyst	24k
EDP Audit	23k
Systems Programmer	22k
Prog Anal Mfg 370/COBOL	20k
Prog Analyst (Several) COBOL - assembler Fortran	20k

Fee and relocation paid
Call Bill Riethmiller
(513) 981-5575
Angus/Baldwin
Associates, Inc.
2145 Luray Avenue
Cincinnati, Ohio 45208
Nationwide Coverage

COBOL PROGRAMMERS

MIDWEST LOCATION

Good Rates & 112 P.D. Weekly

Send Resume To LPL Technical Service, Inc., 2800 North Loop West, Suite 205 Houston, Texas 77092 Phone (713) 683-0371 E.O.E.

COMPUTER SYSTEMS ENGINEERS/ SOFTWARE SPECIALISTS

One of the country's leading diversified financial services is seeking individuals with a broad background in systems engineering.

We're looking for knowledgeable professionals with extensive experience in operating systems, real time systems, minicomputers and microcomputers. Assembly language and structured design experience is also essential. A background in data communications, hardware design and word processing is highly desirable.

The ideal candidates will have a stable work history and an outstanding level of performance. A Masters degree or its equivalent experience in a related field is preferred.

Excellent salaries commensurate with experience. Fine benefits package.

Please send resume, including present level of compensation, to:

CW Box 3334
797 Washington St.
Newton, MA 02160
An equal opportunity employer

PROJECT LEADER

H6000

$20,000 - $24,000

Exeter Associates
Executive Recruiters
P.O. Box 823, Computer Park
Hampton, N.H. 03842
(603) 926-8712

Sr. IMS Programmers

(DB/DC) Utilizing MFS - Immediate opening, 2-3 yrs. exp. using IMS, COBOL in OS/MVT environment. Must have IMS data base, data communications and IMS application programming. Rehab Group, Inc. is a rapidly growing computer consulting firm located in the suburb of Washington, D.C. We offer excellent fringe benefits which include profit sharing, free life ins., etc. Please send resume and salary requirements to:

N.J. Gidders
(703) 921-7900
REHAB GROUP INC.
3110 Columbia Pike
Arlington, VA 22204
we are an
equal opportunity employer

EXPANSION CREATES NEED FOR ...

EDP TRAINING SPECIALIST

Hennepin County (Minneapolis, Minnesota), one of the prime quality of life areas in the nation, has experienced rapid growth in its Data Processing Division. As a result, it is necessary to establish a comprehensive program of training and staff development for Data Processing personnel, creating a need for this position.

Needed is an innovative, results oriented professional to apply his/her skills to the staff development requirements of a diverse, expanding organization. Your primary responsibilities include needs assessment and program planning, design, development, administration and evaluation. You also will apply your process consultation skills to top management organizational planning and training needs.

You can expect strong management support and independence to insure your success in reaching our employee development goals.

If you are ready to assume this level of accountability and creative opportunity, we invite your resume.

Requisites involve a college degree, preferably advanced, and experience as a training specialist in the field of data processing.

Send Your Resume Including A Complete Salary History In Confidence to:

Ruth Cina
Professional Employment,
Data Processing
Hennepin County
PERSONNEL DEPARTMENT
A-3 Government Center
Minneapolis, Minnesota 55487

An Equal Opportunity/Affirmative Action Employer

MIS CAREERS

Owens Corning Fiberglas, a billion dollar leader in the fiberglas industry, is currently seeking candidates for project management and data base administration positions within the company's largest operating division located at corporate headquarters. Both positions require good verbal and written communication skills, willingness to travel 20% of the time, and the special qualifications indicated below:

PROJECT MANAGER

- BS accounting or finance;
- Minimum of 5 years experience in financial analysis and/or accounting;
- Association with data processing environment preferably in the area of financial systems.

DATA BASE ADMINISTRATOR

- BS preferably computer science;
- Minimum 5 years industrial experience including 3 years in data base design and/or administration;
- Exposure to OS/VS1 and CICS.

Each of these growth oriented positions provides the successful applicant a great deal of individual responsibility and professional challenge and is complemented by an excellent compensation and benefit package. Qualified applicants should send a current resume with complete salary history in confidence to:

Mr. G.T. Mills
OWENS CORNING FIBERGLAS
Fiberglas Tower
Toledo, Ohio 43659

Discover the Future of Fiberglas

OWENS CORNING
FIBERGLAS

An Equal Opportunity Employer M/F

PROGRAMMER-ANALYSTS
Southeastern Location

We have an immediate need for Programmers & Analysts to participate in a major state of the art development effort. IBM 370 OS, COBOL and/or BAL required; experience with CICS or Intercomm communications monitors and IMS or TOTAL Data bases helpful.

These postions offer excellent visibility as well as multiple paths of advancement: Above average compensation and benefits programs.

Please respond by resume, given salary history (company employees are aware of this advertisement) to:

Manager of Manpower Planning
Suite 360, 6400 Powers Ferry Rd., NW
Atlanta, Ga. 30339

SYCOR

MANAGER
USER LANGUAGES
SOFTWARE DEVELOPMENT

Continued expansion in User Programming facilities for Sycor systems has created a management position in User Languages. This is a career position with high corporate visibility and requires an assertive individual who is capable of managing software professionals engaged in language development and compiler implementation.

The position requires a broad background in Software Engineering. Particular skills requirements include structured programming techniques; use of higher level languages for systems implementation; knowledge of one or more compilers; table-driven parsers; design of interpretative machines; microprocessor-based systems. Supervisory experience at the project team level or above is required. Advanced degree in Computer Science preferred.

We offer a competitive range of salaries, comprehensive benefits and highly-visible opportunities for future growth. To arrange an interview, send your resume to:

Corporate Employment & Staffing
SYCOR, INC.
100 Phoenix Drive
Ann Arbor, Michigan 48104
1-800-521-3176

"Sycor Puts Computer Power Where the Work is"

SYCOR

PROGRAMMER ANALYSTS

We are recruiting for many urgent requirements in a wide variety of technical areas. These positions offer extraordinary opportunity for advancement, professional growth & higher remuneration.

Syst Prog To $25K
OS/VS INTERNALS & BAL. HASP or 370/VM a +.

Prog/Analyst To $20K
H 6000 w/GCOS & COBOL. Commercial systems.

Tech Consultant To $18K
Software vendor. 1-2 yrs FORTRAN, lite COBOL. Design, write & implement standard lang & proprietary software

Programmer To $18K
370/115 OOS COBOL & D BOMP. Knldg MTC +.

Programmer To $18K
360/370 OS, ANS COBOL with lite BAL

Prog/Analyst To $18K
360/370 OS, COBOL, biz sys. Multifile exp +.

RPG II Prog To $16K
SYS 3/MOO 10 or Sys 32 Order Entry, Invty & Cost Sys.

Burroughs/Prog To $16K
COBOL & RPG w/knldg O/B sys & data communications.

PROG/ANALYST To $16K
360/370 OOS/VS COBOL in MFG environ. Any IMS +.

Programmer To $16K
Sys 3/RPG II. BOMP, MRP & Inventory Control.

Operator/Prog To $14K
Disc sys bkgd w/lite RPG II maintenance programming ability. Opty to learn Univac BC7. For confidential attention, please send resume to:

ROBERT HALF
PERSONNEL AGENCIES
2 Penn Center
Phila, Penna 19102
(215) 568-4580

DIRECTOR
(Computer Center)

Salary: Negotiable. Minimum qualifications: Master's Degree and three years of Programmer/Analyst and Systems Planning experience, plus two years of Managerial experience in these areas (2 years of experience, in excess of the minimum required may be substituted for the Master's Degree). Duties and responsibilities: The Director has responsibility for planning and management of Computer Center which employs 18 people and utilizes a PDP 11/40 on-site and an IBM 360/75 and 370/148 of the State Computer Network. The Director must supervise the design and programming of a University data management system to integrate existing subsystems in academic computing, financial management, student information, and administrative services. Skills in planning, integrating programs and documentation are necessary. The Director must provide leadership in supervising personnel in planning, programming and implementing programs and in the systemized scheduled production of work. Must supervise the development of manuals, production schedules, and documentation. Will work with program director in Computer Science Program. Application deadline: November 25, 1977. Individuals interested in applying should write for an application. Inquiries and applications should be sent to: Dr. William S. Deel, Assistant Vice President for Academic Affairs, Marshall University, Huntington, W. Va. 25701. An Equal Opportunity Employer.

SYSTEMS PROGRAMMER/ANALYST

DataPhase Systems, Inc., a rapidly-growing leader in interactive database applications, has several challenging positions on its software staff. Responsibilities include system development and implementation, field support, and interfacing with vendors and customers. Limited travel. We are looking for two year's active experience in programming, preferably with MUMPS or MIIS, and familiarity with minicomputer systems. Good communication skills required. This is a permanent professional position.

We offer an excellent salary and benefits program, with exciting opportunities for personal and professional growth.

Please call or write in confidence to:

Mr. Lloyd F. Botway
Manager, Systems and Development
DataPhase Systems, Inc.
4528 Belleview
Kansas City, Missouri 64111
(816) 931-7927

An Equal Opportunity Employer M/F

COMPUTER TERMINAL SPECIALIST

Seeking individual with knowledge of digital electronic troubleshooting with a minimum of 2 years' experience in the repair of selectric I/O terminals.

Must be willing to relocate and travel.

Salary commensurate with experience. Liberal company benefits. Offering company-paid health insurance including dental coverage, life insurance, pension program and travel benefits. Interested candidates call or write Mrs. Rasch:

OZARK AIR LINES

P.O. Box 10007 St. Louis, Missouri 63145 (314) 895-6887

An Equal Opportunity Employer M/F

MANAGER OF APPLICATIONS PROGRAMMING

Prominent medical college seeks a highly qualified professional to introduce state-of-the-art scientific applications.

Supervise analyst/programming staff in Scientific Computer Center. Collaborate with faculty and researchers concerning problem analysis and program specifications. Implement contemporary programming methodology. Requires advanced degree in quantitive science and relevant senior-level experience in a scientific, medical or educational setting. Excellent salary and benefits package (including month vacation) unusual professional challenge, desirable, convenient residential location. Send resume including salary history to Caryl Mahoney, Personnel Manager.

ALBERT EINSTEIN COLLEGE OF MEDICINE

1300 Morris Park Ave., Bronx, N.Y. 10461

an equal opportunity employer

Programmers, are you distressed with your present position?

If there is any reason at all why your present position is less than exceptional, you need not suffer needlessly

Right now, because of the incredibly high demand for your services, you can dictate what challenges you seek, where you want to work, who you want to work for, and how much you expect to be paid

So don't despair **Just contact the NCA office nearest you** and find instant happiness

NATIONAL COMPUTER ASSOCIATES

DALLAS
DataPro Personnel Consultants
4256 L B J Freeway
Suite 182
Dallas, Texas 75234

DETROIT
Electronic Systems Personnel
Prudential Town Center
3000 Town Center, Suite 2580
Southfield, Michigan 48075

FLORIDA
Data Sciences Personnel, Inc
Suite 205, 15490 N W 7th Ave
Miami, Florida 33169

HARTFORD
Compass, Inc
900 Asylum Avenue
Hartford, Connecticut 06105

LOS ANGELES
Constellation Enterprises
Suite 900, 3250 Wilshire Blvd
Los Angeles, California 90010

MINNEAPOLIS/ST. PAUL
Electronic Systems Personnel
601 Nicollet Mall, Suite 1715
Minneapolis, Minnesota 55402

NEW YORK
Botal Associates Inc
405 Lexington Avenue
New York, New York 10017

NORTH CAROLINA
TaskForce, Inc
1046 E. Wendover Ave
P O Box 6868
Greensboro, N Carolina 27405

PHILADELPHIA
Systems Personnel
207 Fox Lane
Wallingford, Pa 19086

PITTSBURGH
Electronic Systems Personnel
108 Lawyers Building
428 Forbes Avenue
Pittsburgh, Pennsylvania 15219

SAN FRANCISCO
The Computer Resources Group
Agency Inc
303 Sacramento Street
San Francisco, California 94111

SOUTH ORANGE, N.J.
Systems Search II
75 South Orange Avenue
South Orange, N J 07079

SYRACUSE
CFA Associates Personnel, Inc
(Agency)
2530 James Street
Syracuse, New York 13206

WASHINGTON, D.C.
ESP Systems Corporation
Suite 210
1211 Connecticut Avenue S W
Washington D C 20036

PROGRAMMERS AND ANALYSTS

Free Employment Service
Northeast, Southeast & Midwest U.S.

Scientific and commercial applications ● Software development and systems programming ● Telecommunications ● Control systems ● Computer engineering ● Computer marketing and support

Call or send resume or rough notes of objectives, salary, location restrictions, education and experience (including computers, models, operating systems and languages) to either one of our locations. Our client companies pay all of our fees.

RSVP SERVICES, Dept. C
Suite 700, One Cherry Hill Mall
Cherry Hill, New Jersey 06002
(609) 667-4466

RSVP SERVICES, Dept. C
Suite 300, Dublin Hall
1777 Walton Road
Blue Bell, Penna. 19422
(215) 629-0595

RSVP SERVICES
Employment Agency for Computer Professionals

MIAMI-DADE Community College

Largest Two-year College in the Nation
In Exciting, Sunny Miami, Florida

SYSTEMS PROGRAMMER

Software

Responsible for systems generation, maintenance, and implementation of the teleprocessing monitor; and back-up systems programmer on the college's IBM 370/158-3 compatible CPU. Qualified applicants must have in-depth experience with OS/MVT or SVS and HASP systems programming and a major teleprocessing monitor utilizing IBM 3270's or compatible CRT's.

Minimum requirements:. Bachelor's degree in appropriate field and five years' experience, or an equivalent combination of education and experience.

Salary range: $15,723 - $21,275; plus liberal employee benefits including group health and life insurance, paid vacation and sick leave, tuition waiver, and paid professional development leave program.

Contact Mr. Ferretti at (305) 596-1257, or submit detailed resume to:

Miami-Dade Community College
Personnel Services
11011 S.W. 104 Street
Miami, Florida 33176

An Equal Access Equal Opportunity Community College

CONSIDERING A CHANGE?

The time is right - EDP opportunities at all-time high!

FEE PAID NATIONWIDE COVERAGE CONFIDENTIAL

Companies pay our fee, interviewing & relocation expenses. Client firms are engaged in all industries - Manufacturing, Banking, Retailing, Insurance, DP Services, etc.

Immediate needs include:

Prog/Anal (1-5 yrs)	$15-22K	Soft. Prog (1-5 yrs)	$18-24K
Sys Anal (+5 yrs)	$20-25K	Soft. Prog (+5 yrs)	$24-30K
Sr. Anal/Prog Mgrs	$22-27K	EDP Auditors	$16-22K
Mater Anal (MRP)	$20-26K	Scien. Prog/Anal (mini's, PDP's, etc.)	$16-23K
Mgrs IBM S/3, RPG-11	$18-22K		

For more information, send your resume in confidence to:

Mark Fuller
CADILLAC ASSOCIATES, INC.
32 W. Randolph St., Chicago, IL 60601
(312) 346 9400

OVERSEAS MVS - 3033's

Help convert to MVS IPO 2.0; Link up to the Mid-East, Europe & USA on 650 terminal IMS/TSO network. Prefer TCAM, VTAM, NCP, JES2, TSO, Performance Measurement. To $25K+ Benefits + 6 wks vacation. Free.

Mail resume or call collect:

Sylvie B. Long
(213) 376-1831 or
(213) 990-1875

LONG MGMT CONSLTS AGENCY
15910 Ventura Suite 600
Encino, CA 91436

DIRECTOR DATA PROCESSING

Opportunity exists in 450 bed hospital in central California. Responsible for management of in-house DEC-2040 system and planning and directing hospital information system. B.S. in computer science or related field and 5 years supervisory experience. Competitive salary and excellent benefits. Send resume to: Mrs. Gladys Reed, Employment Manager, Fresno Community Hospital, P.O. Box 1232, Fresno, CA 93715. An Equal Opportunity, Affirmative Action Employer.

VICE PRESIDENT

Systems, Planning and Administration
$38K to $46K

We currently are seeking an individual to direct our clients entire aggressive EDP systems function.

The ideal candidate will have performed successful EDP management in a multi-project, disciplined environment. Passed experience in a large financial institution oriented to the lending edge will be preferred. Due to constant management reporting the the executive level, strong communicative skills and technical abilities are required. This function will manage an organization of well over 150 EDP professionals.

All inquiries will be considered in absolute confidence.

Houser, Martin, Morris & Assoc.
(206) 455-9600
1521-114th S.E., Suite 219
Bellevue, WA 98004

BUY - SELL - SWAP -

Mini Computers

Buy-Sell-Trade-Lease

For Sale

DEC CPU's
11/04 11/34 11/T04
11/05 PDP8E 11/45
11/T34-BA

DEC Discs
RK05J-F RX8A
RP04 RX11BA RK8E

DEC CRT's
VT52 VT20

DEC Memory
MM11L MM11DP
MG10 MF10 MS11JP

Misc. Modules
Hundreds Of Miscellaneous Modules & Cables Available

Call For Other Components In Stock

For Sale
DEC
MM11DP
Core Memory
25% Discount

DATALEASE
700 North Valley Street, Anaheim, CA 92801
(714) 533-3920 TELEX 692439

360/20

RJE Station/Standalone

- Sub 5
- 24K
- Bisynch
- 16 MB Disk
- 300 lpm
- Reader & Punch

LOW $
18 MONTH LEASE
Available 2/1/78

Call: Marty Huysman
313/968-2200

"WANTED TO BUY"

IBM 029's & 129's

Rental Credit Machines Acceptable

Thomas Computer
600 N. McClurg Court
Chicago, IL
312/944-1401

DEC HARDWARE

PDP 11 PDP 8
Processors Peripherals Memories

VT52's, LA36's, LS120's, LA180's
BROOKVALE ASSOCIATES
Seekers and Sellers
(516) 585-0800

CONTINENTAL Information Systems

BUY, SELL, LEASE, SUBLEASE, AND TRADE

New and Pre-owned IBM Equipment

FOR SALE

165-II pre-owned Now
2880-2 in November
1.5MB IBM 158 pre-owned memory
158, 168 new November
158, 168 new December
158, 168 new January

Bill Pomeroy

WANTED

145 IBM Memory
HG2-I2/H2-HG2
2860's
2870's
2880's
158's
168's

SHORT TERM LEASE

135
155-II
360/50

FOR SALE

155 J-k DATed upgrade with 3360's optional
360/50, 370/145

Fred Cholette John Humic

SALE OR LEASE

IBM System/34's available starting in March 1978

John Bartolo

Peripherals and I/O

All 360/370 Disk, Tape Printers, Readers, and T/P

Gene Chappell

CIS

CIS Corp.
600 MONY Plaza
Syracuse, NY 13202
315-425-1900 Telex 93-7435

We Can Better the Best!

Fundways, Ltd. OFFERS 3 YEAR LEASES ON LARGE IBM SYSTEMS AT 7 YEAR RATES.

- •SHOW US THE BEST PROPOSAL OFFERED...
- •IF ITS LEGITIMATE...ITS NEGOTIABLE,
- •IF ITS NEGOTIABLE...WE CAN BETTER IT!

FAST, COURTEOUS NATIONWIDE SERVICE.

OUR EQUIPMENT EXCHANGE CAN HELP YOU REMARKET, SUBLEASE, LOCATE, TRADE-UP AND EXCHANGE.

ABOUT 100 DATA TERMINALS ARE AVAILABLE FOR RENT, LEASE OR PURCHASE. INQUIRIES INVITED.

Fundways, Ltd.
LEASING DIVISION
1100 WILLOWBROOK ROAD
STATEN ISLAND, N.Y. 10314
(212) 761-2800

- ● WE MAKE A MARKET IN IBM EQUIPMENT.
- ● WE SPECIALIZE IN COMPUTER LEASING.
- ●FUNDING PROVIDED FOR ALL TYPES OF EQUIPMENT.

Lease or Sale
370/115
Model H02
with 3410, 3411
TAPES
Call George Gilman
(212) 673-9300

IOA DATA CORP
383 Lafayette St.
New York, N.Y. 10003.

TO BUY
SELL, OR LEASE
CALCOMP
DISKS
1030/230 (3330)
1015/215 (2314-D.D.)
CD 14/CD 12 or 22
(2314-S.D.)

Write or Call
Gene Wendt

(913) 631-2992
CompuMart, Inc.
6622 Black Swan Dr.
Shawnee Mission, KS 66216

Buy or Sell

- Data Terminals
- Mini Computers
- Modems
- Multiplexers
- Printers
- Teletypes
- TWX & Telex

Contact Ken Payne
(214) 630-9700
Carterfone
1111 W. Mockingbird Lane
Suite 1400 Dallas, Texas 75247

BUYING•SELLING•LEASING•TRADING
call... **the Matchmakers**
1·800·654·9179
TOLL FREE!
CSI COMPUTER SALES INTERNATIONAL, INC.

IBM PROCESSORS & PERIPHERALS

	IBM PROCESSORS	IBM PERIPHERALS
SELLING:	370/155-II Dec 1 360/65 System Dec 1 370/145 1 Meg	3344-B2F 3420, 3, 5 3330-1, 11
BUYING:	370/14512 w/ISC 370/158K 370/165 w/DAT	3830-2 3420-7 3340-A2
LEASING:	370/158-38 mo. lease 370/165-36-60 months 370/145-12-18 months	3340-A2 3340-B2 3344-B2F

The Logical Choice
COMDISCO
9701 W. Higgins Rd. Rosemont, Ill. 60018
(312) 698-3000

San Francisco 415/944-1111
Fort Worth 817/534-1774
Atlanta 404/256-5956
Minneapolis 612/854-8107
New York 201/568-9666

DATA 100 TERMINALS
Available for
Immediate Delivery
Model 70,
Model 76 / Model 78
15% Below
Manufacturers List Price
All Transportation and
Installations Included
CALL TERRY SCHADOFF
(703) 821-8770

WANTED:
CENTURY
DATA SYSTEM
MODEL 214
DISK DRIVES
CARSON JANES
COMSHARE, INC.

P.O. Box 1588
Ann Arbor, MI 48104
(313) 994-4800

BUY-SELL-LEASE

026-$	850	085-$	750
029-	1850	514-	800
082-	660	562-	750
083-	1800	557-	2500

Mohawk-6401-6403
NCR-736
Shreddars
Burstars & Decollators
Call Stan Pelc
DP SERVICE Inc.
5505 N. MENARD AVENUE
CHICAGO, ILLINOIS 60630
PHONE 312 / 774-2556

TELETYPE
Buyers Beware
Before you lease, rent
or buy, give ABLE a try!
TELEX -TWX
New and Refurbished
DEC WRITERS
LA 36-120-180
We got 'em all!
ABLE COMMUNICATIONS
20142 State Rd.
Carritos, CA 90701
(213) 924-3378 (714) 761-5661

SELLING

PREVIOUSLY OWNED EQUIPMENT
N.C.R., BURROUGHS, OLIVETTI

N.C.R. 31, 32, 490, and 152-47 & 152-70 TELLER UNITS
N.C.R. 735/736 MAGNETIC TAPE ENCODERS & LINE PRINTERS
N.C.R. 299, 399, & 499 MINICOMPUTERS and CENTURY SYSTEMS

BURROUGHS "L" 3000 THRU 9000 SERIES & TC'S
(W/WO PERIPHERALS) also 8-700 THRU 8-4700 SYSTEMS
OLIVETTI "P" and "A" SERIES
WE ARE AUTHORIZED N.C.R. DEALERS OF
210 ECR'S, SYSTEMEDIA, & MICROGRAPHIC PRODUCTS

BUYING OR SELLING — CALL US FIRST!

KEY-EXIMPORT CORP.
256 LIVINGSTON ST (P.O. BOX 129) NORTHVALE, N.J. 07647
TELE. N.J. (201) 767 3444 N.Y.C. (212) 736 7736
TELEX 135149 CABLE KEYEXIMP NORTHVALE NJ

BUYING

DEC
BROKER IN NEW
&
USED DEC COMPUTER
SYSTEMS
& COMPONENTS
FOR SALE
RK06, RP06, and
11/70-VA
CD SMITH
730 N Post Oak Rd 301
Houston, TX 77024
(713) 686 9405

MAGNETIC TAPE SALE
Slightly used, Money Back Guarantee
U.S. Government Archives
Manufactured to G.S.A. Specs!
2400' 1600'bpi/3200fci
w/Hanging Seal $4.50 ea.
Freight prepaid on orders over 200
Tapes. Shipped within 48 Hrs
CALL or WRITE
Computer Tape Mart
31 Sprague Ave., Amityville, NY 11701
(516) 691-2309
(Brokers Inquiries Welcomed)

ATTENTION IBM 360/370 USERS

DATA AUTOMATION COMPANY, INC.
buy• sell• lease •trade

370 Peripherals
3410/3411 3330/3333 3211/3811
3420/3803 3340/A2, B2 3272/3277

360
CPUs and Peripherels
360/20
LEASE or SALE
2020 C1
w/2203 120pp
2560
w/2 line printar

Peripherals Lowest Price
2401-5 2804-2
2402-2 1403-N1
2403-1 2403-4 W/DD

We'll Buy Any 360 CPU Today

360/40-50-65's Available

Sys/3
CPUs and Peripherals

WANT TO BUY
3741's 3277's
5421 Control Unit
Any System/3
features as listed
3901 - for Sys - 3-10
4140 - for Sys - 3-10
2074 - for Sys - 3-10

FOR SALE
5410-A14 Processing Unit, 16K
3971 5203-2 Attachment
4100 5424-A1 Attachment
6375 2nd Disk Attachment
5424-A1 Multi-Function Card Unit
5203-2 Printer, 200 lpm
5560 36 Add'l Print. Pos
5444-2 Disk Storage Drive
544402 Disk Storage Drive

We'll Buy
5415's-All Models
IBM Rental Credits OK

DATA AUTOMATION COMPANY INC ■ 4888 CASH ROAD ■ DALLAS TEXAS 75247 ■ AC 214 637-8570

IBM UNIT RECORD EQUIPMENT

024 077 085 402 514 652 026
082 087 403 619 657 029 083
088 407 523 602 056 084 089
408 548 604 029 129

We Buy Sell or Lease
360s 1400s 1440s

IBM COMPUTERS

2040 GF, I/O Set
5 Spindle Calcomp 2314
6-60KB Tape Drives/Sims
8-1440 Disc Systems at $4,000
16K 1460 Systems with 1403-3
2803-2 and 2401-6
1401 Disc Systems
360/30's & 40's
any configuration

Big Savings on certain items of Equipment

Call us for all your needs, we buy rent and sell all types of IBM unit record equipment. Over 12 years of serving commercial and government requirements. Contact ACS for proposal

ACS
7126 Mullins
Houston TX 77036
(713) 666-2122
TWX 910-881-1526
EQUIPMENT CORP.

FOR SALE

Burroughs

B3500 computer/peripherals

This equipment can be reconfigured to your requirements.

Computer Capital Corporation
1351 Washington Boulevard
Stamford, Connecticut 06902
Tel 203 357 9663

TELETYPE

Telex - TWX

Model 43-33-32
Large Selection Model 28 & 35
Dec Writer
LA 36 - 120 - 180
Sell or Lease
Immediate Delivery

ABLE COMMUNICATIONS
20142 State Road
Cerritos, Calif. 90701
(213) 924-3378 (714) 761-5661

370/135

Available For
Lease Immediately
By End User
192K - 384K
Includes ISC, IPA, Etc.

Roger Challen
c/o DDI
Hopkinton, Mass.
(617) 435-6851

201-947-4200

WE WANT TO BUY

158's any configuration
155's, 145's, 135's
3420's all models
3340 A2's & B2's
370 IBM Memory
3830's & 3330's

FOR SALE OR LEASE

145-12
available with ISC
in December

135 FE
Configured to your
specifications in Nov

360 CPU's
40H 2 Chan. & 50I
3 Chan. avail. now

I/O Sets
1403's, 2821's, 2540's
available immediately

145 H
available immediately
with or without
additional AMS memory

360/65-IH
with 3 Channels
avail. in November

168 LJ
available with
channels in May 1978

155-II
avail. now with or
without DAT Also 3360's
and model changes

3420-5's & 3's
available immediately

360 CORE
40 & 50 core
available now

IPS Computer Marketing Corp 2460 Lemoine Avenue Fort Lee N J 07024

CMI BUY LINES

BUY-SELL-LEASE-TRADE

370/165 370/168
Call Bob Van Hellemont
(313) 642-8000

370/145-158
Call Ron Baker
(313) 642-8000

370/155
Call John Mills
(313) 642-8000

370
115/125/135
Call Pam Hoban
(313) 642-8000

360/30 360/40
360/50 360/65
Call Gary Smith
(313) 642-8000

360/20
1130
Call Jim Carleton
(313) 642-8000

1403's 2821's
2501's 1442's
1443's
If you rant any of tha abova and ara sending back to IBM call ma. I'll show you how to maka monay using your rental cradits. Wa also buy ownad aquipmant and sell all of thasa units.
Call Kathy Housey
(313) 642-8000

IN CANADA
IBM 360 370
System / 3
Buy-Sell-Lease
Call Don DuPuis
CMI Company
P.O. Box 893
Windsor, Ont.
N9A 6P2
(519) 258-8910

System/3
Model 15
Call Jerry Roberts
(313) 642-8000

3420/s 3803/s
3333's 3830's
3330's 3340's
Call Darryl Hastings
(313) 642-8000

3742's
3741's
5496's
Call Jerry Sharon
(313) 642-8000

3270 CRT's
Printers/Controllers
Call Jim Carleton
(313) 642-8000
129-029-059-026

CMI CORPORATION *The IBM Specialists*
1500 N. Woodwerd Ave., Birminghem, Mich 48011, (313) 642-8000
Member Computer Dealers Association

BURROUGHS USERS

YOU CAN SAVE UP TO 50% ON YOUR PERIPHERALS

PRINTERS:

- 1800 1pm (Same source as Burroughs for the 9246-2) $33,000
- MICR on line (First Time)
- Controlers for PCC or DLP are also available

TAPE UNITS:

- 6250 bpi Operating Now
- 1600 bpi up to 200 ips
- Uses proven STC drives and controlers

MAIN MEMORY for Large Scale systems (6700, 6800)

- Core in 393,216 byte inc.
- 325 ns access time
- Comparable to Burroughs planar memory
- Purchase price $48,000

COMBUR
3025 Palos Verdes Drive N., Palos Verdes Estates, CA 90274
(213) 378-7002 (301) 299-3038 (604) 273-9940

Rent-Sell-Buy

Immediate Delivery

- Texas Instruments 733-743-745-810
- DEC Writer II-III
- Teletype ASR 33-Model 43
- Lear Siegler ADM 3A
- 029-129-Tab Keypunches

Call Collect: Stewart Krakover or Barry Thompson

Data Rentals/Sales
8611 Heyden Pl, 213-559-3822 Culvar City, CA 90230

BUY·SELL·TRADE IBM EQUIPMENT

360/65 or 65 MP CORE

1.5 Megabytes For Sale

Independent memory in single cabinet. Great savings on floor space, power, air conditioning and maintenance. 5th port available. Priced right. Intermem.

CALL DICK BAKER (305) 561-5207

dataware
Intracoastal Building
3000 NE 30th Place Suite 309
Fort Lauderdale Florida 33306
Telephone (305) 561 5207
MEMBER CDA

BUY • SELL • LEASE • TRADE

SYSTEM/3 370/115
370/125

ECONOCOM

ECONOCOM
1255 LYNNFIELD ROAD
P O BOX 17825
MEMPHIS, TENNESSEE 38117
901-767-9130

MEMBER COMPUTER DEALERS ASSOCIATION

We are buying, selling, & leasing!

Buying: 3830, 3420
Selling: 360/65, 360/50, 360/40
Leasing: 370/155, 370/145, 360/65

Please contact:
Linda Vaughn/(415) 955-0220
Reenie McCarthy/(415) 955-0238

ITEL CORPORATION

BUY·SELL·LEASE·TRADE

PURCHASE LEASEBACK / RENTAL CREDITS

Write or call collect today to these representatives!

SYSTEM/3
All Peripherals
call Ted Arbuckle

370's
All Peripherals
call Don Norris

SYSTEM 32's,34's
3270 CRT's
call Marilyn Morris

EAM EQUIPMENT
Refurbished, eligible for IBM M/A
call Don Norris
or Duke Crumpton

360's
All Peripherals
call Duke Crumpton

MCC

(214) 634-2750
TWX 910-861-4171
METROPLEX COMPUTER COMPANY, INC.
Suite 1208 Honeywell Bldg.
1111 W. Mockingbird Lane Dallas, Texas 75247

Industry's Fastest Growing Computer Dealer

MEMBER CDA

BUY – SELL – LEASE – BROKERAGE

Let the Nation's Largest Wholesale Dealer
Buy, sell, lease, sub-lease, or be your agent in placement of your pre-owned IBM 360/370/System 3, or other units

COMPUTER INTERNAT'L LTD
BEACH COMPUTER CORP
CWC's Leasing Division
COMPUTER WHOLESALE CORP
(504) 581 7741

Suite 507/508 First National
Bank of Commerce Bldg
New Orleans, LA 70112
Member Computer Dealers Assn

IMMEOIATE DELIVERY

PDP 11/03 SYSTEMS
NEW IN BOX
SYSTEMS INCLUDE
PDP-11/03 EA-1 Each
MSV-11-B (4K RAM)-2 Each
DLV-11 (Serial I/O)-2 Each
RXV-11-BA (Dual Floppy Disk) 1 Each
REV-11A (Floppy Boot)-1 Each
Substantial Discount
Other Configurations Considered
Call JOHN ARANT
CPU, INC.
(301) 840-9524

WANT TO PURCHASE
IBM 3705-E3
w/1542, 1302, 1643
4701, 4714, 4650
CALL
Gerry O'Rielly
COMDISCO®
201-568-9666

WANT-TO-BUY

Model 5500
DATAPOINT
With 2 mass storage disks
Buy outright • Leese or Sub-lease
Call: 800/527-3248
214/258-2414

capital
equipment brokers
930 N. Baltiina • Irving, Taxes 75061

For Sale
By Owner
370/155K
W/5 Channels & Speedup
Avail. 30-60 Days
Call Mr. Olds
313-642-8000 x274

---

dataserv

buy • sell • lease • trade

370
115 and 125
Steve Lacny
800-328-2406

For Sale or Lease
Any 115/125 configuration
Sending 115/125 Back to IBM
Call us! We'll show you how to make money using your rental credits.

370
135 through 168
Dave Miller
616-637-8481

For Sale or Lease
135 - 145 - 155
CPUs — Peripherals — Memory
We'll Buy
Any 370 CPU
Wanted
Your 370 CPU for sublease

370
Peripherals
800-328-2406

For Sale or Lease

3211/3811	3340/A2,B2
3272/3277	3410/3411
3330/3333	3420/3803

STOP! Before you send any of the above machines back to IBM call us. We'll show you how to make money.

360
CPUs and Peripherals
Neal Johnson
800-328-2406

For Sale or Lease
360/30 - 40 - 50 - 65s
CPU — Peripherals — Memory
We'll Buy
Any 360 CPU
IBM Peripheral
Non-IBM Perph/Memory

Sys/3
CPUs and Peripherals
800-328-2406

For Sale or Lease
5406 - 5410 - 5412 - 5415
CPUs — Peripherals — Memory
We'll Buy
Your 5406/5410
5415 — Rental credit machines
Peripherals — Memory

Call Toll Free 800-328-2406
or 612-544-0335
Or write: Dataserv Equipment, Inc., 9901 Wayzata Blvd.
P.O. Box 9488, Minneapolis MN 55440

WAITING FOR A **3031** AND
NEED AN INTERIM CPU?
TRY OUR
3155 WITH **DAT**
AND **AMS PSU**
ONE YEAR LEASE COST LESS
THAN IBM'S RATE ON A 3148
AT TWICE THE CPU POWER
2, 3, 4, & 5 YEAR LEASES AVAILABLE

TNCC

THOMAS NATIONWIDE COMPUTER CORPORATION

Brian M. Battle – (312) 944-1401
600 North McClurg Court-Suite 4202A
Chicago, Illinois 60611

Paul Nortman – (516) 752-1000
1 Huntington Quadrangle-Suite 4S13
Hungtington Station, New York 11746

FOR SALE
S/360-30F
128K-TWO Selector Channels
1-2540 Card Read Punch
1-1403N1 Printer (1100lpm)
5-2401-3 Tape Units (RWW)
4-2311 Disk Stor. Units
5-2314 (A1) DASF Spindles
Control Units 2804/2821/2841
AVAILABLE EARLY 1978
Call Collect-Walt Kamelka
(203) 622-1762

SCAN DATA 2250

Available For Immediate Delivery

Savings Up To 50% Of Manufacturers List Price

FOR SALE OR LEASE

CALL LINDA SWOPE
(301) 792-0491

PURCHASE/SALE/LEASE

ALL 360 & 370 SYSTEMS

360/30
360/40
360/50
370/125
I/O
370/135

CORPORATE COMPUTERS, INC
115 Mason St., Greenwich, Conn. 06830 (203) 661-1500
Member Computer Dealers Association

OPERATING LEASES

on new
IBM PERIPHERALS
used

call, telex or
write for quotes

**JOSEPH A. BLITT
ASSOC. INC.**
(201) 277-6401
TLX 139-407
Box 268
Summit, N.J. 07901

PROFESSIONAL
DEALER/LESSOR
OF IBM
COMPUTER SYSTEMS

Bob Russell
Jack Emery
Dave Hepburn
Paul Baillie

SYSTEMS MARKETING INC
200 E. Thomas Road
Phoenix, Arizona 85012
(602) 264 5600 Telex 667 334

SMI

IMMEDIATE DELIVERY

DEC LSI -11
KD 11 - F

$755

Mini Computer Suppliers, Inc.
25 CHATHAM ROAD
SUMMIT, N.J. 07901
(210) 277-6100
Telex 13-6476

For Sale
(3) 3420-5
Single Density
(1) 3420-5
Dual Density
(1) 3803-2
Control Unit
Available December 1977
Contact: Jim Jamicson
(804) 643-4200

Commonwealth Computer Advisers
CCA 707 East Main Street
Suite 1850
Richmond, Va. 23219

BUYING SELLING LEASING

370/

135
138
145
148
155
158
165
168

214/630-6700
Pioneer Computer Marketing
1165 Empire Central Place Dallas, Texas 75247

370/ULTRALEASE

**135H • 138J
145J • 148K
155K • 158I
3270-3272-3277
SYSTEM/3-SERIES/1
OEC PDP-11**

COMPUTER SYSTEMS
313/779 8700 26401 Harper
St. Clair Shores, MI 48081

FOR SALE
BURROUGHS 17/14

48K, (2) 4.6 MMB Disks
100 LPM Printer
Data Recorder

ALSO SYSTEM/32

MASON
COMPUTER SERVICE
Bill Mason
(713) 521-0469

OPERATING LEASES

3, 4, 5 YEAR WALKAWAYS
– NEW OR USED 370'S
– MEMOREX PERIPHERALS

MACHINE AVAILABILITY
– 138/148/3033 ON ORDER POSITIONS
– 135/145/155 PORTFOLIO

ICO CORPORATION

17 Sharwood Pl.
Greanwich, CT 08810
Dick St., Francis
203/661-2804

3301 Woman's Club Driva
Ralaigh, N.C. 27812
Dean Painter
919/787-8085

700 E. Mapla
Birmingham, MI 48011
Ed McKalvay
313/845-1482

Bruce Dunlap
415/494-1575

2 Palo Alto Sq.
Palo Alto, CA 94304

FOR SALE
HARRIS 1200

REMOTE TERMINAL
CARO READER,
CONSOLE & PRINTER

Write to:
CW Box 3207
797 Washington St.
Newton, Mass. 02160

GO GREYHOUND

When you plan to
Buy or Sell your
Computer Equipment

For complete information call the Greyhound Representative in your area.

FOR SALE
3135 DH - Avail. Now
7830 & 6 - 7330

WANT TO BUY
IBM - 1419, 3340-A2 & 3340-B2
3135 H w/4655, 8981, 6982,
7855, 7861

U.S.	Home Office	T.A. Takash	602-248-6037
	New York	Dick Vantola	914-949-1515
	Chicago	Peta Ahern	312-298-3910
	Dallas	M.W. "Bill" Tucker	214-233-1818
	San Francisco	Henry Paulson	415-283-8980
INTERNATIONAL	Canada	Don Maunder	418-368-1513
	U.K./Europa	Joe Gold	022-61-27-54
	Maxico	Andres' Contreras	905-543-6950
	Austro-Asia	John Hallmark	214-233-1818
	Eurasia	Don Haworth	214-233-1818
NON IBM	Dallas	John Hallmark	214-233-1818

BUY • SELL

TELETYPE

Models 32 • 33 • 43
Telex • TWX/DDD
BRPE'S
NATIONAL
TELETYPEWRITER CORP.
207 Newtown Rd.
Plainview, N.Y. 11803
(516) 293-0444

---

*WE BUY
AND SELL
AND INSTALL*

NEW AND USED COMPUTER ROOM FLOORING

Raised Floor Installation, Inc.
19 Sebago St.
Clifton, N.J. 07013
Tele (201) 778-2444 in New Jersey
(212) 594 4039 in New York
(415) 546 9466 in Calif

FORSYTHE
McARTHUR

Dealer & Lessor in IBM Computers

919 North Michigan Avenue
Chicago, Illinois 60611
(312) 943-3770
Member, Computer Dealers Assoc.

---

efm computer
leasing, inc.

3000 marcus avenue
lake success, ny 11040
(516) 488-7878

LEASE • BUY • SELL

360/370 CPUs & PERIF.

ATTRACTIVE LEASES ON

360/40 360/65
360/50 370/135

FOR SALE

Two I.B.M. (3330-1) Disk Storage Units and One I.B.M. (3333-1) Disk Storage Controller.

On maintenance contract and in excellant condition. Bids accepted until 3 P.M., 12/13/77 and must be accompanied by 5% bid deposit. For bid documents contact City Purchasing Officer, City of Saginaw, 1315 S. Washington, Saginaw, Michigan 48501. (517) 75-35411

IBM 370/135
with 320K to 512K

FOR LEASE
1, 2, 3, & 4 Years
224 to 416K AMS Memory
FOR LEASE
1, 2, 3 & 4 Years
2 IBM 3333-11
6 IBM 3330-11
for lease 1, 2 & 3 Years
Call Terry Schadoff
(703) 821-8770

WANTED
DATAPOINT HARDWARE

Disks, Printers
Diskettes, Processors

**Gilmore Leasing Co.
(415) 493-1199
John Withers**

WANTED TO BUY

***IBM 370/155
with or without DAT
Contact: Harry Blair
(713) 524-8249***

---

dearborn giveth:
370 CPUs; 370-145 Hg-avail nov. 1; 370-155 JI-w/dat avail. nov. 15
360 CPU; 2050I 2 chan. - avail. dec. 1, 1977; 2065I 3 chan. - avail. dec. 1, 1977
peripherals; 2821-1; 2804-1; 2401-1; 2402-2

dearborn taketh: all tapes & disk 2401's; 2803's, 3803's, 3420's, 3333's, 3330's, 3830's, 2501's, 1442's, 1403's.

Call Tom Millunchick or Jim Spalding: 312/827-9200
or any dearborn office

dearborn
computer company
dealer IBM computers
systems software
leasing

1460 renaissance dr., park ridge, ill. 60068 (chicago) 312/827-9200
toronto (416) 621 7060 • st louis (314) 727-7277 • houston (713) 965 0788

BUY-SELL TRADE

For Computer
Call Action Write

CAC

404/458-4425
P.O. Box 80572
Atlanta, Ga. 30366

FOR SALE OR LEASE

370/155-J Available Jan 1978
370/168-LK Available
June 1978 (Lease Only)
370/168-M Available
Oct. 1978 (Lease Only)

Contact:
Frederick D. Lehmann

MARTIN MAREITTA
DATA SYSTEMS
Orlando, Florida
(305) 855-1050, X-7410

WANTED

ALL 360/370 SYSTEMS AND SYSTEM/3
AND PERIPHERALS
WE BUY • SELL • LEASE • TRADE

transdata

Member Computer Dealers Association

PO Box 47762 Dallss, Texas 75247 PHONE (214) 631-5647

THE IMP 1001 CABLE

- INSTALLS QUICKLY
- ECONOMICAL (LIST PRICE $99.00)
- ACCOMMODATES SIGNAL SHIELDING
- GENERAL PURPOSE
- IMMEDIATE DELIVERY

The IMP /1001 Cable is a

NEW AND INNOVATIVE CABLE WHICH ELIMINATES THE TIME CONSUMING AND TEDIOUS INSTALLATION OF INTERNAL CABLES ON THE DATA GENERAL NOVAS* AND ECLIPSE* COMPUTER SYSTEMS. IT QUICKLY ATTACHES TO THE BACK PLANE OF THE MAIN FRAME OR EXPANSION CHASSIS, ELIMINATING ALL WIRE WRAP OPERATIONS. THE CABLE ACCOMMODATES 50 SIGNAL WIRES, 4 OF WHICH ARE SHIELDED TWISTED PAIR. THE PERIPHERAL SIDE OF THE CABLE CAN BE SUPPLIED WITH EITHER AN EDGE OR CANNON CONNECTOR (NOVA 820, 1220, 2, 3 AND ECLIPSE TAKE EDGE CONNECTORS)

INDUSTRIAL MACHINE PARTS INCORPORATED

1008G ASTORIA BOULEVARD
CHERRY HILL, NEW JERSEY 08003
(609) 424-2950

FOR SALE USED

SPERRY UNIVAC 8440 DISK CONTROLLERS AND DRIVES

Four 5033-99 Disk Controllers
Eight 8440-02 Disk Storage Units
Eight Duel Access Features
All Equipment Has Been Under Continuous Sperry Univac Maintenance

Contact
Peul Bach (213) 787-7300
INTERSCIENCE SYSTEMS, INC.
7814 Burnet Ave.
Van Nuys, CA 91405

WANTED OLIVETTI

P603(s)

NCR

399(s)

Unique Business Systems
20245 W. 12 Mile Road
Southfield, Mich. 48076
(313) 356-8700

IBM 360/65 MP FOR SALE

2 - 2065-J Processing Units
5 - 2365-13 Processor Storage Units
2 - 2860-3 Selector Channels
AVAILABLE 2ND QTR. 1978

CONTACT:
James S. Johnson
Wis. Dept. of Transportation
P. O. Box 7396
Medison, WI 53707
(608) 266-0880

For Sale Or Lease System 3/15

Complete Systems

Any configuration from B 19 to D 24
30 to 90 days delivery depending upon your requirements.
Also complete inventory tapes — disks.
Printers — CPU Upgrades

Call Avery Reynolds 214-630-6700
TWX 910-861-4936

Pioneer Computer Marketing
1165 Empire Central
Dallas, Texas 75247

Member of Computer Dealers Association

DEC (2) RP04's

Available for December Delivery
Approximately One Year Old
Currently Under DEC Maintenance

Franklen Computer Systems, Inc.
1545 Wilshire Blvd., #204
Los Angeles, CA 90017
(213) 484-0330
Frank J. O'Kane

FOR SALE OR LEASE

3277's AVAILABLE 30-60-90 DAYS

SAVON SYSTEMS INC.
22 Colony Court
Smithtown, N.Y.
516 271-0429

ORDER YOUR

LA 36 DEC Writer II PRINTER TERMINAL

at Heath's low, low mail order price...

only $1495

Shipped Motor Freight, prepaid to your nearest terminal within the Continental U.S. Include phone number for notification of arrival. Arrangements for home delivery, at extra charge at your option. No C.O.D. orders.

Also available: LAXX-KG EIA (RS-232C) Interface. With cable and connector $65.00

LAXX-LM Acoustic Coupler. Mounts in LA36 with hardware provided $250.00

Send check or money order to:
Heath Company, Dept. 367-351
Benton Harbor, MI 49022
Or use the Heath "Hotline":
(616) 982-3411

IBM 158 Attached Processor

AVAILABLE DECEMBER 1st

IBM 370/145IH2

AVAILABLE JANUARY 1

Contact: Jerry Borisy
JBI ASSOCIATES, INC.
445 Union Blvd., Suite 303
Lakewood, Colo 80228
(303) 988-0820

WANTED

BURROUGHS 'L' Series
DEC & DATA GENERAL
Minis & Peripherals
NCR: 399 & 299

Boynton Business Systems
87 Route 208
Wallkill, N.Y. 12584
914-895-2007

FOR SALE OR LEASE

3340/B2	1/31/78
3410/3 w/D.D.	1/31/78
2501/B1	1/31/78
3046/1	Now
3215/1	Now
2030/128K 2 ch.	Now

KENNSCO, INC.
612-533-5800

FOR SALE BY USER

360-50 512K ALL IBM
3 SELECTOR CHANNELS
IBM MAINTENANCE
IMMED. DELIVERY
$95,000

NORTH AMERICAN LIFE & CAS. CO.

Bob Moore 612-377-5511
1750 Hennepin Ave.
Minneapolis, MN 55403

FOR SALE

IBM 370/158 MEMORY
1.5 MEGABYTES

Available December

CAPITAL FUNDING CORP.
2175 Lemoine Ave.
Fort Lee, N.J. 07024
(201) 461-3158

WANTED TO BUY

PURCHASE CREDIT - 148J

Will Buy December 1, 1977.
Also - 135's

Call DATRONIC
(312) 992-0760
WILL FOSS

FOR SALE

Interdata 7/16 system, 64k, lineprinter, disk & tape	$25,000
Interdata 6/16 system, 64K, tape, printer, crt (2)	30,000
Interdate 7/32 cpu, 64k, OMA, FTG, PT, interfaces	15,000
Calcomp model 563-30 inch drum plotter	4,000
Calcomp model 936-36 inch drum plotter	9,000
Calcomp 925/1036 offline drum system	40,000
Calcomp 905/936	22,000
Calcomp 925/960 flatbed system (never used)	45,000
Tektronix 4014 displays	7,000

WANTED

Dataprinter model VI32C line printer
Interdata model 7/16 CPU's

Call concerning previously owned mini-computer systems and computer graphics equipment

Bob Roe
Romelan Industries
348 E. Payne Avenue
Campbell, CA 95008
Phone (408)379-9120

WE'RE #2 IN DEC

IMMEDIATE DELIVERY

RP03	$11,000
RP02	5,000
RK05	3,500

SEND FOR **FREE!!** PRICE LIST ON DEC EQUIPMENT TODAY! DEPT. CW-1

AMERICAN USED COMPUTER

P.O. BOX 68, KENMORE STATION
BOSTON, MASSACHUSETTS 02215
• 617-261-1100

Short Term 370/155-11

Serial # 10132 Available 12/1/77

2MB, DAT

Contact Hal Gosnell (804) 643-4200

CCA

Commonwealth Computer Advisers, Inc.
707 East Main St., Suite 1650
Richmond, VA 23219

FOR SALE

State of Georgie Surpius Computers: Univec Series 70/7 Computer Equipmant;

Quentity	Model	Description
1 Ee.	70/668-31	Communication Controller-Muiti-Channei, (CCM 4051);
1 Ea.	70/668-21	Communication Controller-Muiti-Chennei, (CCM 4303);
1 Ee.	70/668-11	Communication Controller-Muiti-Channel, (CCM 1057);
9 Ee.	70/720-21	ADS Buffers;
74 Ea.	70/720-22	ADS Buffers;

For further information end inspection of ebove equipment contact Mr. Munroe Jones, Phone (404) 658-2639 or Gery C. Monroe, Phone (404) 656-3245.

Please note thet in order for your bid to be acceptable you must secure e bid form from this office which stetes thet you must have e check in the emount of 20% of your total bid in order to be acceptebla.

Sealed bids for these computers may be obtained from the above or State of Georgie, Department of Administrative Services, 1050 Murphy Avenue, SW, Bldg. 4, Atlenta, GA. 30310. Opening date and time: December 9, 1977, 2 P.M. State of Georgia reserves the right to reject any end/or eii bids.

Wanted to Acquire Computer Service Bureau

CHICAGO AND/OR NEW YORK AREA

Company Must Specialize In Servicing Banks end/or Sevings end Loans. Reply to CW Box 3332, 797 Weshington St., Newton, MA 02160. Principals Only.

FOR SALE By Owner

Univec High Speed Printer Model 0758-00 with Aux. Printer Control Model 5011-00

Call 817-335-9311

THE FREE PUBLIC LIBRARY

of the City of Paterson, New Jersey, a tax exempt educational institution, plans to establish e non-profit regionel book processing center. Donations of the following eppreciated: Minimum Configuration, IBM 360/30 65K or equiveient, 370 series, System components; 4 disc drives 5445, 4 tape drives 800 CPI, 1 card reader/punch, 1 line printer 600 LPM, 1 2803 tape control.

Equipment must be in operational condition and under maintenance contact. Call or write:

Mr. M. Wassermen, Deputy Director
250 Broadway
Paterson, N.J. 07501
(201) 881-3754

FOR SALE

IBM 370/158 KJ

5 Channels and 3213

Available January 15, 1978
Sealed Bids Only
Bids Due November 21, 1977
Contact: **George Prussin**

OPM

O.P.M. Leasing Services, Inc.
99 Wall Street New York, New York 10005
(212) 747-0220
out of state call (800) 221-2674

For Sale

PDP 11 DECEMBER DELIV.

Datasystem 357
Includes
PDP 11/34, 64K
2-RK06 (28MB) Disks
1-VT52 Terminal
1-LA11 (180 CPS) Prntr.
Including full accounting application software.

Spiridellis & Associates, Inc.
(the big neme in small computers)
14 W. 40th Street
New York, N.Y.
(212) 221-7270

MINICOMPUTERS & SYSTEMS

Don't waste company time or money
Check with us before you buy or sell
Brand New Data Ganaral
Nove 2/10 - Save 40%
Jumbo 1200 - Save 30%
Nova 3/12 - Immed. Del.
New & Used Dec Equipment:
PDP 11/04 — Immed. Del.,
RK 05 — Immed. Del.
Many others New & Used
Tape Systems for DG
from $3,900
WANTED
Minicomputer systems & peripherals.
Buyers weiting for many items:

MINICOMPUTER EXCHANGE
(408) 733-4400
TWX 910 339 9272

FOR SALE

TEXAS INSTRUMENTS 990/4 & 990/10 EQUIPMENT IMMEDIATE AVAILABILITY

990/10 Computer System including:

- 1 990/10 CPU W/8K, EEC, and Map
- 5 24K Add-On Memory Modules, EEC
- 2 Dual Floppy Drives
- 2 25 MB Dual Trident Drives
- 2 Mag. Tepe Drives (800 BPI) - 9T
- 1 733 ASR Silent 700
- 4 913 VDTs
- 2 306 Printer
- 1 804 Cerd Reader

Plus Misc. Chessis, Cebles end Penels. Units are like new, end have been under TI Maintence Contracts.

990/4 Computer Systems including:

- 4 990/4 CPU W/4K RAM
- 8 12K Memory Expension Modules
- 8 Duel Floppy Drives
- 4 733 ASR Silent 700
- 8 Bell Deta Set Interfece Kits

Plus Misc. Chassis, Cables and Panels. Units are in original factory cartons, never used.

Several Computer Automation Alpha 16 Mini-computers are also available.

●

Serious parties please call for information, or address bids to: Charles Baughman

DIEBOLD INCORPORATED
Department 9-61/TI
Canton, Ohio 44711
Phone: (216) 489-4471

IBM 360/65

6-3330, 2-3211, 2540,
1-1419, DOS/VS, GRASP
LOS ANGELES &
ORANGE COUNTY
FROM $65/HOUR
NATIONAL SHAREDATA CORP.
3215 West Warner Ave.
Santa Ana, Calif. 92704
Contact: RON ROGERS
(714) 979-0611

IBM 360-20
$50,000.00
Complete IBM
Maintenance Records
*2020, Sub S, DS
*2311 (2)
*2415
*2501, Mod A1
*2520, Mod A1
*1403, Mod 2
IBM Unit Record Equipment:
* 083 ($1300)
*085 ($900)
*548, Mod 001 ($1200)
* 029, Mod 822 (4) ($1500)
*059, Mod 002 (2) ($1100)
D.P. Manager
2200 Army Street
San Francisco, CA 94124
(415) 548-5300

AL NEWMAN'S sale of the week

SELECTRIC TERMINAL

- 14.8 cps print speed
- 13 inch line length
- 10 or 12 characters/inch
- 6 or 8 lines/inch
- IBM 2740-1, 2 line control
- IBM 2740 keyboard/printer

This deal can't be beat. Not only do you get a quality terminal for a fraction of the cost of anything else on the market, but you also get typewriter quality. Can be interfaced to a mini- or microcomputer or used with IBM computers. These terminals are worth the price of a typewriter alone. Our warranty is limited to replacing any defective parts for a period of 90 days following receipt of equipment. Interchangeable print element, of course. Includes attractive desk. Optional documentation package $25.00

SUPER SALE

JUST **$675**

DATA GENERAL CRT'S in original box

NEW **$1,295**

MODEL 6012 VIDEO TERMINAL

- 80 × 24 Flicker-free display
- Roll, page, page-buffered modes
- Edit Keyboard
- Half/full duplex
- 20 ma/60ma/EIA
- 110 through 4800 baud
- Use with D G Controllers 4010, 4023, 4060, 4100, 4255, 4256, 4257, 4258
- Fully software supported by D G

PRINTEC • 100

NEW **$995**

- "Line-at-a-time," "On-the-fly," impact, using a Multiple-Split Helix rotating drum and electromagnetically activated print hammers.
- ASCII 64 character subset
- 100 characters/second
- 132 columns

LSI-11 16K MEMORY $999.00

The Motorola MMS1110 is a 16K-word x 16-bit plug-in main memory system for DEC's LSI-11 microcomputer system. Mounts directly into a H9270 backplane slot and is both hardware and software compatible with the LSI-11 system.

Employs the MCM6604 4K Dynamic RAM component. Mounted on a single PC board that contains timing, control and bus interface logic. Memory refreshing is controlled by the LSI-11.

- High Density
- Low Cost
- Fast Access and Cycle Times
- High Reliability
- Byte Operation
- One Year Warranty

DIABLO DISKS

Diablo 31 (without P S)	1,950
Diablo 33F (without P S)	1,250
Diablo 33F & Diablo 31 with power, 1 fixed & 1 removeable platter	3,275
Power Supply by Dynage	125

QUICK DELIVERY

ON THESE NEW LSI-11 PRODUCTS

SPECIAL SALE

MSV11B - 4K RAM $535
DEC List $625 NCE Price $594

KD11F - LSI-11 CPU with 4K RAM . . . $891
DEC List $ 990

Monostore XI - 16K RAM by Monolithic Systems $1311

(10% discount for cash with order on LSI 11 items.)

CONTROL DATA® 752 DISPLAY TERMINAL $1475

The 752 operates in either scroll or page mode using X Y coordinate addressing and reading with a blinking underline cursor. All display logic is packaged on a single printed circuit board which is easily removed. The 752 provides extensive capability features ease of use, ease of installation, reliability, maintainability, totally silent operation and safety.

NEW

- 1920 character display
- 110-9600 bps, switch selectable
- RS232-C/CCITT V.24

90-DAY PARTS & LABOR WARRANTY
Call to Reserve

NEWMAN COMPUTER EXCHANGE (313) 994-3200

370/145-I2 · FOR SALE OR LEASE

AVAILABLE — DECEMBER 15, 1977

Serial #(10920). Features: 2150, 4660, 6111, 6982, 7855, 8810
(also 612K AMS Memory to make 1MB system)

(2) 370/145-I2

AVAILABLE - FEBRUARY 1, 1978

Serial #'s (10515 - 11192)

Contact Dick Nelson
COMMONWEALTH COMPUTER ADVISERS, INC.
707 East Main Street
Richmond, Virginia 23219
(804) 643-4200

IBM UNIT RECORD EQUIPMENT

MACH.		LEASE	MACH.	SALE	LEASE	MACH.	SALE	LEASE
024	$ 300	$20/Mo.	083	$1800	$60/Mo.	526	$1400	$70/Mo.
026	$ 900	$35/Mo.	084	$2500	$100/Mo.	548	$1600	$70/Mo.
029	$1900	$55/Mo.	085	$1200	$60/Mo.	552	$1000	$40/Mo.
046	$1200	$50/Mo.	088	$2500	$175/Mo.	557	$3000	$100/Mo.
047	$1500	$60/mo.	402	$1000	$60/Mo.	Disc Packs		
056	$ 200	$15/Mo.	403	$1200	$70/Mo.	2316	$ 89	$5/Mo.
059	$1400	$50/Mo.	407	$1500	$80/Mo.	3336(1)	$ 129	$10/Mo.
077	$ 450	$25/Mo.	514	$ 800	$45/Mo.	3336(11)	$ 199	$15/Mo.
082	$ 850	$35/Mo.	519	$1000	$55/Mo.	3348(70)	$ 950	$40/Mo.

THOMAS COMPUTER CORPORATION
600 N. McClurg Court · Suite 4202
Chicago, Illinois 60611
(312) 944-1401

FOR SALE

SYSTEM 3/10

16K Disk System

$24,500

FOB Pennsylvania
Call
(914) 238-9631

SOFTWARE

SAVE
RPG/RPG II TO COBOL TRANSLATOR

This package accepts all types of RPG and produces ANS COBOL while approaching 100% error free conversion. The resulting COBOL program is moduler in design and easy to read and maintain. Several client service options are availabla: Parpetual Lease, Conversion only, Claan Compila and full implementation including production JCL, test and Installation. Over 100 satisfied customars.

For Prompt Reply Write or Call Us Today

DASD CORPORATION

Milwaukee, Wisconsin 53217, Suite 301,
8705 N. Port Washington Rd., (414) 351-2600

Turn to
McCormack & Dodge
Fixed Asset Analysis/Accounting
Rated No. 1 in 1976
Datapro/Datamation Poll.
Find out why.

McCORMACK & DODGE CORPORATION
381 Elliot St., Newton, MA 02164
(617) 964-6610

RPG II COMPLETE SYSTEMS

- Generel Ledger W/Sub Ledgers
- Billing end Accounts Receivable
- Professional Services Billing
- Notes Receivable
- Generel Payroll-
  - Also Sub Contrector Peyroll
- Job Cost-Construction
- Accounts Peyable
- Work Order end Purchase Order Syetem
- Joint interest Billing end Royelty
- Lease inventory System
- Apartment System

Abova aveliable with thorough documentation. Also custom systems design end programming.

HAILE COMPUTER SYSTEMS
4006 Mischire
Houston, Texas 77025
(713) 668-1681

TONE 3
TSO for VSI
Redesigned to eliminate TCAM and the staggering overhead of user swapping
ISP
System to System Communication for VSI
Intersystem Spool Processor

Two unique products from TONE Software Corp

(write or phona for details)

TONE Software Corp.
(714) 636 8501
11588 Trask Avenue
Gardan Grova, Ca 92643

ACCOUNTS PAYABLE SYSTEM

Many design features including:
- Auto. discount calculation
- Cost center reporting
- G/L interface tape
- Check reconciliation
- Written in COBOL
- Single data base
- Complete documentation
- 3 year warranty

Low purchase price or rent. Write or call for more information.

LEGLER SYSTEMS COMPANY
23 Charles Hill Road
Orinda, CA 94563
(Est. 1972) (415) 254-1264

Q.

Where do I turn for the best software packages available?

Our packages are made for each other. And you.

- ☐ MMS Generel Ledger
- ☐ MMS Accounts Peyable
- ☐ MMS Accounts Receivable
- ☐ Net Change MRP
- ☐ Q-PAC Peyroll
- ☐ FILETAB
- ☐ S/3 General Ledger
- ☐ S/3 Accounts Payable

SOFTWARE INTERNATIONAL
Elm Square. Andover, Mass 01810 (617) 475-5040
New York (914) 332-0040 Washington D C (301) 770-6460
Philadelphia (302) 995-7101 Chicago (312) 729-7410
San Diego (714) 292-9833 Toronto (416) 862-0521 Houston (713) 444-3346
Columbus, OH (614) 773-2167 San Francisco (415) 433-5797

Turn to
McCormack & Dodge
Accounts Payable Information System
Rated No. 1 in 1975/1976
Datapro/Datamation Poll.
Find out why.

McCORMACK & DODGE CORPORATION
381 Elliot St. Newton, MA 02164
(617) 964-6610

---

the choice of
MB
Milton Bradley Toys

ACCOUNTING IV GENERAL LEDGER

Our software packages—General Ledger, Accounts Receivable, Accounts Peyable, and Standard Cost—are the choice of leaders like Milton Bradley *not by chance, but by design.* For deteils, cell (201) 488•2100

informatics inc
Worlds Lergest in Software Products
65 Route 4 River Edge N J 07661

ACCOUNTING SOFTWARE FOR DEC RSTS/E CTS-500 USERS

From one of tha pioneers in commerciel data processing using RSTS. Successful installations in menufacturing, distribution, service bureau uses. Completely on-line, interactive systems. If you are installing or have installed e RSTS/E or CTS-500 system, contact us first for cost-effective solutions in: ACCOUNTS PAYABLE; GENERAL LEDGER; FINANCIAL REPORTING

The design specifications for these packages were developed by accountants for use by accountants. All packages provide excellent eudit-trail, extensive user prompting, fast data entry, full file-maintenance and inquiry cepebilities, moduler design and construction.
These are consolidating packages end support multi-division company and multi-company corporate accounting functions.
For more information, contact us et:

(219) 936-2183
p.o. Box 160
plymouth, in 46563
Div. of Young Door Co.

Plycom services

PAYROLL PERSONNEL
SUPER/PAY
ONLY $960
ANS COBOL
60+ USERS

Users on IBM, Burroughs, Univac and minis such as NCR, DG, & Four Phase

Easy to Use 30 Day Trial
Occidental Computer Systems
10202 Riverside Drive
No. Hollywood, Calif. 91602
(213) 763-5144

RPG II SYSTEMS

- *A/R-OPEN ITEM OR B/F
- *ACCOUNTS PAYABLE
- *GENERAL LEDGER
- *PAYROLL AND LABOR DIST.
- *INVENTORY
- *CREDIT UNION' MAILING, ETC

Extensive Documentation Provided
Bancroft Computer Systems
P.O. Box 1533, Dept. C
West Monroe, LA. 71291
(318) 388-2236

TIME & SERVICES

AMDAHL 470/V6

- Remote batch and time sharing services through nation wide communictions network
- Wylbur
- APL
- IDMS
- Mark IV
- A complete array of support systems

For Information Call Collect
COMPUTER USAGE COMPANY
Customer Services
(408) 738-4300

IBM 360/50

ALL SHIFTS 384K, 3-2401V, 14-2314, 1403-N1, 2540, 3 sel. ch.

VECTOR SYSTEMS CORP.
University City
Science Center
3624 Market St.
Philadelphia, PA 19104
Contact: LEO GENOVESE
(215) 387-6500

Datacenter 370/158

3 meg VS2
Specializing in
Remote Job Entry
and Batch
Excellant Technicel Support
Very Attractive Rates
Contact: Stu Keriavsky
(212) 564-3030
Datamor
132 W. 31st St.
New York, N.Y. 10001

REMOTE JOB ENTRY

PHOENIX-HECHT

- IBM 370/158-3
- Nationwide incoming Watts lines
- Complete systems end softwere support
- Full epplication Library (including all eccounting applications)
- All high-level lenguagas
- Prime time end off hours
- VS 2 HASP INTERCOMM, DYL-260
- Complete dete security including off-site storege

For information
call Walter Czamiak
at (312) 861-7100

PHOENIX-HECHT
233 N. Michigan Avenue
Chicago, Illinois 60601

I.B.M. 360-40

All Shifts 128K, 4-2401 MOD-2, 9-2314, 1403-N1, 2540, 1401 Compatibility.
From $35/Hour

Restaurant Associates, Inc.
1540 Broadway
New York, N.Y. 10036

Contact:
Al Pelmo (212) 974-4966
Charles Laigey (212) 974-4967

WE ARE
BROKERS OF COMPUTER TIME
New York & New Jersey Only
Computar Reserves, Inc.
(212) 687-1840
(201) 676-1881

IBM 360-65
3 (3/4 MB)
4 - 7420-5 TAPE
6 - 3330-1 DISK
COMPUTER TIME AVAILABLE
Call: (201) 386-8376
386-8377
E. Hanover, N.J.

IBM s360/50
ALL SHIFTS AVAILABLE
256K, 4-2401 Mod VI
4-2314, 1403-N1
2540
DOS & SPOOLING
Hart Systems, Inc.
One Commercial Ave.
Garden City, N.Y. 11530
Chuck Doscher
(516) 248-2290

COMPUTER TIME FOR SALE
LOCATION
NORTHERN
NEW JERSEY
IBM 370/148 1MEG
WITH:

6-3340 Fixed Head Disk Drives

3-3420/Mod 7 Tape Drives

1-3505 Reader 1100 CPM

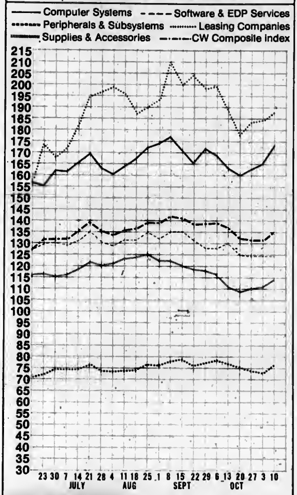
1-3525 Card Punch 300 CPM

2-3277/2 CRTS

1-3203/Mod 4
121200 LPM

FOR FURTHER INFORMATION CONTACT
(201) 488-4200
Ext. 47

COMPUTERWORLD Computer Stocks Trading Indexes



Earnings Reports

EM&M

Three Months Ended Oct. 1

	1977	1976
Shr Ernd	$.18	$.25
Revenue	27,379,000	22,184,000
Tax Cred	.....	560,000
Earnings	1,303,000	1,633,000
6 Mo Shr	.46	1.17
Revenue	60,660,000	66,398,000
Tax Cred	...	560,000
Earnings	3,368,000	7,114,000

FAIRCHILD CAMERA AND INSTRUMENT

Three Months Ended July 3

	1977	1976
Shr Ernd	$.29	$.52
Revenue	117,744,00	113,267,000
Earnings	1,571,000	2,858,000
6 Mo Shr	.70	.56
Revenue	230,869,000	206,377,000
Earnings	6,800,000	3,088,000

GENERAL AUTOMATION

Year Ended July 30

	1977	1976
Shr Ernd	$.75	.....
Revenue	84,476,000	$70,737,000
Tax Cred	420,000	.....
Earnings	1,674,000	(769,000)
3 Mo Shr	.18	.10
Revenue	22,632,000	22,633,000
Tax Cred	312,000	.....
Earnings	408,000	463,000

HEWLETT-PACKARD

Three Months Ended July 31

	1977	1976
Shr Ernd	$1.07	$.65
Revenue	341,051,000	277,477,000
Earnings	30,527,000	18,472,000
9 Mo Shr	3.13	2.05
Revenue	980,931,000	782,880,000
Earnings	88,669,000	57,319,000

INFOREX

Three Months Ended July 1

	1977	1976
Shr Ernd	$.17	$.17
Revenue	15,624,000	16,476,000
Tax Cred	77,000	132,000
Earnings	512,000	499,000
6 Mo Shr	.32	.29
Revenue	30,030,000	30,383,000
Tax Cred	156,000	201,000
Earnings	940,000	852,000

Computerworld Sales Offices

Vice-President/Marketing
Roy Einreinhofer
Advertising Administrator
Terry Williams
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800
Telex: USA-92-2529

Boston
Robert Ziegel
Northern Regional Manager
Mike Burman
Account Manager
COMPUTERWORLD
797 Washington Street
Newton, Mass. 02160
Phone: (617) 965-5800

New York
Donald E. Fagan
Eastern Regional Manager
Frank Gallo
Account Manager
COMPUTERWORLD
2125 Center Avenue
Fort Lee, N.J. 07024
Phone: (201) 461-2575

San Francisco
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Donna Dezelan
Account Coordinator
COMPUTERWORLD
1212 Hearst Building
San Francisco, Calif. 94103
Phone: (415) 495-0990

Los Angeles
Bill Healey
Western Regional Manager
Jim Richardson
Account Manager
Judy Milford
Account Coordinator
COMPUTERWORLD
1434 Westwood Boulevard
Los Angeles, Calif. 90024
Phone: (213) 475-8486

Japan
Mr. Shigema Takahashi
General Manager
DEMPA/COMPUTERWORLD
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo 141
Japan
Phone: (03) 445-6101
Telex: J2424461

United Kingdom
Tony Vickers
COMPUTERWORLD
PUBLISHING LTD.
2 Bath Road
London W41LN
England
Phone: (01) 995-3352
Telex: UK-934287

West Germany
Hans-Jurgen Ballnath
COMPUTERWORLD GmbH
8000 Munich 40
Tristanstrasse 11
West Germany
Phone: (089) 36-40-36
Telex: W.Ger-5-215250-HKFD

TRADE QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOVEMBER 9, 1977

All statistics compiled, computed and formatted by
TRADE QUOTES, INC.
Cambridge, Mass. 02139

COMPUTER SYSTEMS

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	AMDAHL CORP	22- 44	42 1/4	+4 1/4	+11.1
N	BURROUGHS CORP	55- 91	65 3/8	+1 1/2	+2.3
O	COMPUTER AUTOMATION	18- 30	24 5/8	- 1/8	-0.5
N	CONTROL DATA CORP	20- 26	21	+1	+5.0
O	CRAY RESEARCH INC	15- 29	24 1/2	+3 1/4	+15.2
N	DATA GENERAL CORP	35- 51	48	+3 3/8	+7.5
N	DATAPOINT CORP	18- 34	34 1/4	+2 5/8	+8.3
N	DIGITAL EQUIPMENT	37- 53	45 1/4	+1 3/4	+4.0
N	ELECTRONIC ASSOC.	2- 3	2 1/8	+ 1/8	+6.2
A	ELECTRONIC ENGINEER.	8- 11	9 5/8	- 1/4	-2.5
O	FOUR-PHASE SYSTEMS	13- 19	18 3/8	+1 1/4	+7.2
N	FOXBORO	41- 54	42 1/8	- 3/8	-0.8
O	GENERAL AUTOMATION	6- 9	6 1/4	+ 1/2	+8.6
O	GRI COMPUTER CORP	1- 1	5/8	0	0.0
N	HEWLETT-PACKARD CO	69- 87	72 1/4	+1 7/8	+2.6
N	HONEYWELL INC	43- 55	45 3/4	+2 3/8	+5.4
N	IBM	245-286	252 3/4	+3 1/8	+1.2
O	MANAGEMENT ASSIST	5- 9	8 5/8	+ 5/8	+7.8
O	MICRODATA CORP	7- 18	11 1/8	- 1/8	-1.1
O	MODULAR COMPUTER SYS	5- 8	7 5/8	+ 3/8	+5.1
N	NCR	32- 47	41 3/8	+1 3/8	+3.4
O	PRIME COMPUTER INC	12- 23	19 5/8	+ 1/2	+2.6
N	PERKIN-ELMER	17- 22	19 1/4	+1 3/8	+7.6
N	RAYTHEON CO	16- 33	30 3/8	+1 1/2	+5.1
N	SPERRY RAND	30- 42	33 5/8	+2 1/4	+7.1
O	SYCOR INC	8- 15	14 3/4	+ 3/4	+5.3
A	SYSTEMS ENG. LABS	5- 8	7	+ 3/8	+5.6
A	WANG LABS.	10- 14	11 1/8	+ 3/4	+7.2

LEASING COMPANIES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ALANTHUS CORP	3- 5	4 3/8	- 1/8	-2.7
O	BOOTHE COURIER CORP	8- 10	10 5/8	- 1/8	-1.1
O	COMDISCO INC	10- 13	10 7/8	+ 1/8	+1.1
A	COMMERCE GROUP CORP	1- 3	3/4	- 1/8	-14.2
A	COMPUTER INVSTRS GRP	1- 2	1	0	0.0
N	DATRONIC RENTAL	0- 2	1 1/8	0	0.0
A	DCL INC	1- 2	2 1/8	+ 1/8	+6.2
N	DPF INC	6- 9	8 1/8	+ 1/8	+1.5
N	ITEL	13- 22	18 3/8	+1	+5.7
N	LEASCO CORP	19- 27	25 1/8	+2 1/4	+9.8
O	LEASPAC CORP	1- 2	1	0	0.0
O	NRG INC	1- 1	1/8	0	0.0
A	PIONEER TEX CORP	5- 11	5 3/4	+ 3/8	+6.9
N	U.S. LEASING	10- 15	13 7/8	+1 1/4	+9.9

SOFTWARE & EDP SERVICES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED COMP TECH	0- 2	1/2	0	0.0
O	ANACOMP INC	7- 10	8 3/4	0	0.0
A	APPLIED DATA RES.	5- 10	7 1/4	0	0.0
N	AUTOMATIC DATA PROC	23- 30	26 5/8	+ 5/8	+2.4
O	COLEMAN AMERICAN COS	2- 2	1 7/8	0	0.0
O	COMPU-SERV NETWORK	9- 15	10 3/4	+1	+10.2
O	COMP ELECTION SYSTMS	6- 10	9 1/2	0	0.0
O	COMPUTER HORIZONS	1- 1	1 1/4	0	0.0
O	COMPUTER NETWORK	6- 11	10 1/8	+ 3/4	+8.0
N	COMPUTER SCIENCES	7- 9	8 1/8	+ 1/2	+6.5
O	COMPUTER TASK GROUP	1- 2	1 7/8	0	0.0
O	COMPUTER USAGE	1- 3	1 3/8	0	0.0
O	COMSHARE	5- 8	7	+ 1/4	+3.7
O	DATA DIMENSIONS INC	3- 5	3 7/8	- 1/2	-11.4
O	DATATAB	1- 2	1 1/4	0	0.0
N	ELECTRONIC DATA SYS.	14- 20	15 5/8	+1 3/8	+9.6
O	INSYTE CORP	2- 3	1 1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 2	2	0	0.0
O	KEANE ASSOCIATES	3- 4	3 7/8	0	0.0
O	KEYDATA CORP	1- 3	1 3/8	- 1/8	-8.3
A	LOGICON	7- 17	11 5/8	- 1/8	-1.0
A	MANAGEMENT DATA	1- 2	1 1/8	0	0.0
A	NATIONAL CSS INC	13- 27	14 1/2	-11 1/8	-43.4
O	NATIONAL DATA CORP	4- 7	6 1/8	+ 1/4	+4.2
A	ON LINE SYSTEMS INC	16- 22	17	0	0.0
N	PLANNING RESEARCH	3- 6	4	+ 1/8	+3.2
O	PROGRAMMING & SYS	1- 1	1/4	0	0.0
O	RAPIDATA INC	2- 3	2 1/2	+ 1/8	+5.2
O	REYNOLDS & REYNOLDS	17- 20	18	+ 1/4	+1.4
O	SCIENTIFIC COMPUTERS	1- 4	3 1/2	0	0.0
O	TYMSHARE INC	14- 23	19 5/8	+1 1/8	+6.0
A	URS SYSTEMS	4- 5	4 3/4	+ 1/8	+2.7
N	WYLY CORP	1- 2	3/4	0	0.0

PERIPHERALS & SUBSYSTEMS

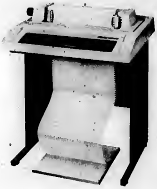
EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADDRESSOGRAPH-MULT	10- 15	13 1/4	+ 3/8	+2.9
O	ADVANCED MEMORY SYS	7- 9	6 3/4	- 1/4	-3.5
N	AMPEX CORP	8- 11	9 1/8	+ 3/8	+4.2
O	ANDERSON JACOBSON	3- 5	4 1/4	+ 1/2	+13.3
N	APPLIED DIG DATA SYS	10- 20	13 1/2	+ 3/8	+2.8
O	BEEHIVE INT'L	5- 12	5 1/8	- 3/4	-12.7
A	BOLT,BERANEK & NEW	7- 9	7 1/4	+ 1/2	+7.4
N	BUNKER-RAMO	8- 12	10 1/4	+ 1/4	+2.5
A	CALCOMP	3- 5	2 3/4	+ 1/8	+4.7
O	CAMBRIDGE MEMORIES	1- 4	3	-	-2.0
N	CENTRONICS DATA COMP	20- 30	20 1/4	+ 3/8	+1.8
O	COGNITRONICS	1- 1	3/4	0	0.0
O	COMPUTER COMMUN.	5- 8	6 1/4	+ 1/4	+4.1
O	COMPUTER CONSOLES	4- 7	4	+ 1/4	+6.6
A	COMPUTER EQUIPMENT	2- 3	3	+ 1/4	+9.0
O	COMPUTER TRANSCEIVER	1- 1	1 1/8	- 1/8	-10.0
O	COMTEN	9- 13	9 3/4	+ 1/4	+2.6
N	CONRAC CORP	19- 28	20 5/8	+1	+5.0
O	DATA ACCESS SYSTEMS	4- 5	3	0	0.0
O	DATA 100	6- 9	8 5/8	+1 1/4	+16.9
A	DATA PRODUCTS CORP	9- 17	16 1/2	+ 7/8	+5.5
O	DATA TECHNOLOGY	3- 4	4 1/4	0	0.0
O	DATUM INC	1- 2	1 5/8	- 1/8	-7.1
O	DECISION DATA COMPUT	2- 3	1 7/8	0	0.0
O	DELTA DATA SYSTEMS	1- 1	3/8	0	0.0
A	DOCUMATION INC	6- 9	9 1/4	+1 5/8	+21.3
O	DATARAM CORP	2- 12	11 1/2	+2	+21.0
N	ELECTRONIC M & M	4- 5	3 1/2	0	0.0
O	FABRI-TEK	1- 2	1 1/8	0	0.0
O	GENERAL COMPUTER SYS	0- 2	1	0	0.0
N	HAZELTINE CORP	8- 12	9 5/8	+1 3/8	+16.6
N	HARRIS CORP	28- 42	41 7/8	+4 1/8	+10.9
A	INCOTERM CORP	10- 18	17 1/2	+ 3/4	+4.4
O	INFOREX INC	4- 7	5 1/8	+ 1/4	+5.1
O	INFORMATION INTL INC	9- 14	9 1/4	- 1/4	-2.6
O	INTEL CORP	38- 57	45	+3	+7.1
A	LUNDY ELECTRONICS	3- 6	4 1/8	- 1/4	-5.7
O	MSI DATA CORP	6- 13	12 1/4	+ 7/8	+7.6
O	MEMOREX	23- 34	26 1/2	+1 5/8	+6.5
N	MOHAWK DATA SCI	5- 8	6	+1	+20.0
O	PENRIL CORP	2- 5	4 7/8	+ 1/8	+2.6
N	PERTEC CORP	7- 10	9 3/4	+ 7/8	+9.8
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	PRECISION INST.	2- 2	1 1/2	0	0.0
O	QUANTOR CORP	3- 5	3 1/4	- 1/4	-7.1
O	RECOGNITION EQUIP	6- 10	7 3/8	+ 1/2	+7.2
O	SCAN DATA	1- 2	7/8	+	+7.1
O	STORAGE TECHNOLOGY	10- 18	18 1/8	+1 7/8	+11.5
O	T BAR INC	7- 13	12	+ 5/8	+5.4
O	TALLY CORP.	4- 6	3 1/2	0	0.0
A	TEC INC	7- 10	6 7/8	- 1/4	-3.5
N	TEKTRONIX INC	29- 38	37 1/8	+ 1/4	+0.6
N	TELEX	2- 3	2 5/8	+ 3/8	+16.6
O	WILTEK INC	1- 1	5/8	- 1/8	-16.6

SUPPLIES & ACCESSORIES

EXCH		PRICE 1977 RANGE (1)	CLOSE NOV 9 1977	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMERICAN BUS PRODS	6- 8	6 3/8	+ 5/8	+10.8
O	BALTIMORE BUS FORMS	1- 4	1 1/4	0	0.0
A	BARRY WRIGHT	10- 14	13 3/8	+ 7/8	+7.0
O	CYBERNATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	14- 19	16 3/4	- 1/8	-0.7
N	ENNIS BUS. FORMS	6- 7	5 3/4	- 1/8	-2.1
O	GRAHAM MAGNETICS	11- 17	17 1/4	+ 1/4	+1.4
O	GRAPHIC CONTROLS	13- 18	14	-1	-6.6
N	3M COMPANY	46- 56	48 3/8	+2 1/8	+4.5
O	MOORE CORP LTD	24- 37	25 1/2	+1 3/4	+7.3
N	NASHUA CORP	16- 28	20 1/8	+ 3/4	+3.8
O	STANDARD REGISTER	18- 25	21 1/2	+ 1/2	+2.3
O	TAB PRODUCTS CO	10- 19	9 1/2	0	0.0
N	UARCO	18- 22	19 1/4	+1 1/4	+6.9
A	WABASH MAGNETICS	10- 15	13	+1 1/8	+9.4
N	WALLACE BUS FORMS	17- 21	18 1/2	- 1/8	-0.6

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

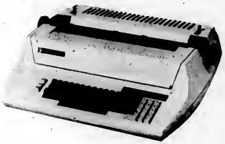
LAST CALL
DDI TERMINAL SALE
ENDS DEC. 15!



LA-36 DECwriter II

$1,375

...DDI's single unit price



DIABLO® HY-TERM 1620-1

$2,595

...DDI's single unit price

(Also, 1620-3 for $2,795)

TI 745 Portable Data Terminal

$1,695

...DDI's single unit price

Don't miss these savings...call DDI, America's leading terminal supplier, now!

Favorable pricing is just one factor in the value equation which assures you your best buy comes from DDI. Whatever your need in data communications equipment, DDI has the quality products you want—ready for delivery. And with DDI, you also get:

- A single source for DEC, TI, ADDS, DIABLO, OMNITEC, TECHTRAN.
- Full range of new products.
- Choice of rent/lease/buy plans.
- Unique Combination Savings Plan.
- Nationwide maintenance service.
- Nationwide branch network for prompt response to your needs.

Data Dimensions, Inc.®

51 Weaver St., Greenwich, Ct. 06830 TEL. (203) 661-1700

Branch offices: New York City • Morris Plains, N.J. • Philadelphia (Cherry Hill, N.J.) • Washington, D.C. • Detroit (Southfield) • Chicago • Atlanta • Dallas • Houston • Los Angeles (Encino) • San Francisco